

# Atlantic Richfield Company

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October 2, 2015

Mr. Steven Way  
On-Scene Coordinator  
Emergency Response Program (8EPR-SA)  
US EPA Region 8  
1595 Wynkoop Street  
Denver, CO 80202-1129

Delivered via e-mail

**Subject: September 2015 Monthly Progress Report**  
**Rico-Argentine Mine Site – Rico Tunnels**  
**Operable Unit OU01, Rico, Colorado**

Dear Mr. Way,

This progress report describes activities conducted during the month of September 2015 at the Rico-Argentine Mine Site (site) and activities anticipated to occur during the upcoming month. These activities are organized by task as identified in the Removal Action Work Plan. This progress report is being submitted in accordance with Paragraph 35.a of the Unilateral Administrative Order for Removal Action (the “UAO”), dated March 17, 2011 (effective March 23, 2011).

Under separate cover, an updated project schedule will be submitted to EPA that reflects approval to defer completion of certain work activities to the 2016 construction season. A meeting with EPA will be scheduled in mid-to late October following hydraulic commissioning of the Enhanced Wetland Demonstration system to discuss the UAO schedule modifications.

## ACTIVITIES FOR SEPTEMBER

This section describes significant developments during the preceding period including actions performed and any problems encountered during this reporting period. A summary of the St. Louis Tunnel Discharge Constructed Wetland Demonstration (Wetland Demonstration) Treatability Study system performance is provided as Attachment 1 (including key performance indicator figures, tables, and a wetland plant update).

### Site-Wide Activities

- Monitored site for any major security concerns and system functionality.
- The appraisal for the Small Tracts Act (STA) 1 application was submitted to the US Forest Service (USFS). The appraisal was responded to and accepted by the USFS. The easement surveys were finalized for San Miguel Electric and Rico Telephone and will be available for the STA 1 closing.
- Continued to coordinate with the Rico Town Manager regarding the Town’s water pipeline replacement project progress and plans for soil removal, sampling, and disposal at the Soil Lead Repository.

- Continued to work on acquisition of a local source for borrow soil.
- Conducted weed control for noxious plants onsite.

#### **Task A – Pre-Design and Ongoing Site Monitoring**

- Performed additional evaluation of potential improvements to surface water flow data gathering and telemetry.
- Collected data from pressure transducers at DR-3, DR-6, and AT-2. Collected manual flow measurements from DR-3 and DR-6.
- Inspected the St. Louis Ponds System, pond water levels, free-board, and condition of outlet pipes and overflow spillways. The pond network appears to be flowing well and in good condition.

#### **Task B – Management of Precipitation Solids in the Upper Settling Ponds**

- Diverted the majority of St. Louis Adit discharge to Pond 12. A slip stream flow continues to be diverted to the Wetland Demonstration vertical and horizontal treatment trains prior to being routed to Pond 12.
- Began design of hydraulic controls to bring Pond 10 on-line for additional detention time and settling.
- Continued planning for removal of remaining mining/mineral processing by-products from Upper Ponds and collected LIDAR scans for volume calculation.

#### **Task C – Design and Construction of a Solids Repository**

- Met with the Colorado Department of Public Health and Environment (CDPHE) on September 17, 2015 for a site walk and inspection of the Solids Repository.
- Continued work for interim management of mining/mineral processing by-products.
- Prepared a draft of the Solids Repository Construction Completion Report for internal review (included as-built drawings and documentation of quality control and quality assurance testing).

#### **Task D – Hydraulic Control Measures for the Collapsed Area of St. Louis Tunnel Adit**

- Continued monitoring of AT-2 and BAH-01 to assess water levels in the tunnel at approximately 30 ft and 60 ft in-by of the point at which flows daylight in the SLT channel.
- Completed design of pressure transducer installation in BAH-01 and borehole spatial survey of both AT-2 and BAH-01.
- Completed design of a passive tunnel dewatering system to be implemented this fall via AT-2 to mitigate rising head levels within the tunnel.
- Completed planning and design of a series of tunnel drawdown and recovery tests to evaluate the volume and rate of excess flows into the tunnel resulting in rising head levels versus SLT flows exiting the tunnel.
- Continued design of a pressure relief well system to be installed in 2016 to address future head levels versus SLT flows based on recent data. Recent data indicates some reduction in hydraulic conductivity associated with the tunnel debris is occurring.
- Continued work on storm water controls to protect the St. Louis Tunnel discharge and improve stabilization of the exposed (collapsed) section of the tunnel.

#### **Task E – Source Water Investigations and Controls**

- Continued Blaine Tunnel water depth and flow monitoring behind the Blaine Cofferdam at the Blaine Tunnel Flume.

#### **Task F – Water Treatment System Analysis and Design**

- Conducted floc testing of St. Louis Adit discharge water.
- Completed H<sub>2</sub>S monitoring throughout the month and calibrated H<sub>2</sub>S monitors.

- Maintenance and process adjustments conducted on the Wetland Demonstration for performance improvement.
- Performed monthly sampling, monitoring, and OM&M activities at the Constructed Demonstration Wetlands.
- Shut down flow to the Vertical and Horizontal Wetlands for accumulated solids volume characterization and clean out on 9-29-2015. Additionally, the installation of the static mixer upstream of DR-3 occurred simultaneously to take advantage of the shut down.
- Continued Enhanced Wetland Demonstration (EWD) construction.
  - Completed stepping (grading) of Pond 14 in preparation of Aeration Cascade installation.
  - Completed final grading of the settling basin and manganese removal cell at Pond 18.
  - Completed liner installation for the biotreatment cell, settling basin, and manganese removal cell.
  - Continued welding HDPE pipe and installing piping between the wetland cells.
  - Placed drainage rock in the biotreatment cell and commenced biotreatment cell matrix placement.
  - Shaped and graded the aeration cascade footprint.
  - Continued shaping and grading storm water drainage swales.
  - Continued procurement of equipment and materials.

## **ACTIVITIES FOR UPCOMING MONTH**

This section describes developments expected to occur during the upcoming reporting period, including a schedule of work to be performed, anticipated problems, and planned resolution of past or anticipated problems.

### **Site-Wide Activities**

- Perform ongoing security observation of the site.
- Continue water flow management for St. Louis Adit discharge to accommodate new construction.
- Continue borrow soil investigation and potential site acquisition.
- Work with USFS to complete STA 1 transfers to AR and submit STA 2 application to the USFS.
- Coordinate with Town of Rico to sample and receive mining impacted soils from pipeline installation excavation.
- Submit updated project schedule to EPA which reflects deferral of certain work activities to 2016.
- Prepare site for winter access.

### **Task A – Pre-Design and Ongoing Site Monitoring**

- Inspect the St. Louis Ponds System, water levels, and free-board.

### **Task B – Management of Precipitation Solids in the Upper Settling Ponds**

- Continue routing St. Louis Adit discharge to Pond 12.
- Continue planning for removal of remaining mining/mineral processing by-products from Upper Ponds and quantify solids with additional LIDAR scans.
- Construct hydraulic controls to rout St. Louis discharge flow through Pond 10.

### **Task C – Design and Construction of a Solids Repository**

- Submit the Solids Repository Construction Completion Report to the CDPHE.
- Continue work for interim management of mining/mineral processing by-products.

### **Task D – Hydraulic Control Measures for the Collapsed Area of St. Louis Tunnel Adit**

- Monitor water levels real-time in the St. Louis Tunnel at AT-2 and BAH-01.
- Construct modifications to AT-2 overflow pipeline and implement siphon / step test on AT-2.



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- Complete stabilization measures on the collapsed portion of the Adit.
- Complete evaluation of water volumes in tunnel workings and excess water flows giving rise to rising head levels.
- Implementation of this work will need to be reassessed pending results of the ongoing SLT evaluation and dewatering.
- Install storm water controls and stabilize St. Louis Tunnel at the portal concrete structure.

#### **Task E – Source Water Investigations and Controls**

- Download tunnel flow data for the Blaine Tunnel Flume.

#### **Task F – Water Treatment System Analysis and Design**

- Complete Vertical and Horizontal Treatment Train settling basin solids volume characterization and clean out.
- Continue scoping additional data needs as necessary related to treatment system alternatives.
- Continue bypassing Pond 15.
- Perform monthly sampling, monitoring, and OM&M activities at the Constructed Demonstration Wetlands.
- Continue EWD construction.
  - Complete placement of biotreatment cell matrix and manganese removal cell HDPE filter media.
  - Continue Pond 14/15 embankment improvements and storm water swale construction.
  - Install aeration cascade troughs and flume.
  - Complete HDPE pipe welding and installation.
  - Complete shaping and grading storm water drainage swales and access roads.
  - Complete procurement of EWD equipment and materials.
  - Install chemical injection and telemetry system components.
- Commence hydraulic commissioning of the EWD.
- A meeting with EPA will be scheduled to discuss UAO schedule modifications following hydraulic commissioning of the EWD.

If you have any questions, please feel free to contact me at (951) 265-4277.

Sincerely,



Anthony R. Brown  
Project Manager  
Atlantic Richfield Company

cc: R. Halsey, Atlantic Richfield  
T. Moore, Atlantic Richfield  
B. Johnson, Atlantic Richfield  
N. Block, Esq., Atlantic Richfield  
C. Sanchez, Anderson Engineering  
D. Yadon, AECOM  
J. Christner, Weston Solutions  
S. Riese, EnSci  
A. Cohen, Esq., Davis Graham & Stubbs  
W. Duffy, Esq., Davis Graham & Stubbs  
A. Piggott, Esq., U.S. EPA



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D. McCarthy, Copper Environmental  
K. Sessions, AEEC  
C. Hixenbaugh, AEEC  
B. Florentin, Amec Foster Wheeler

file: Atlantic Richfield Rico Archives, La Palma, CA  
AECOM Denver Project File

## Attachment 1



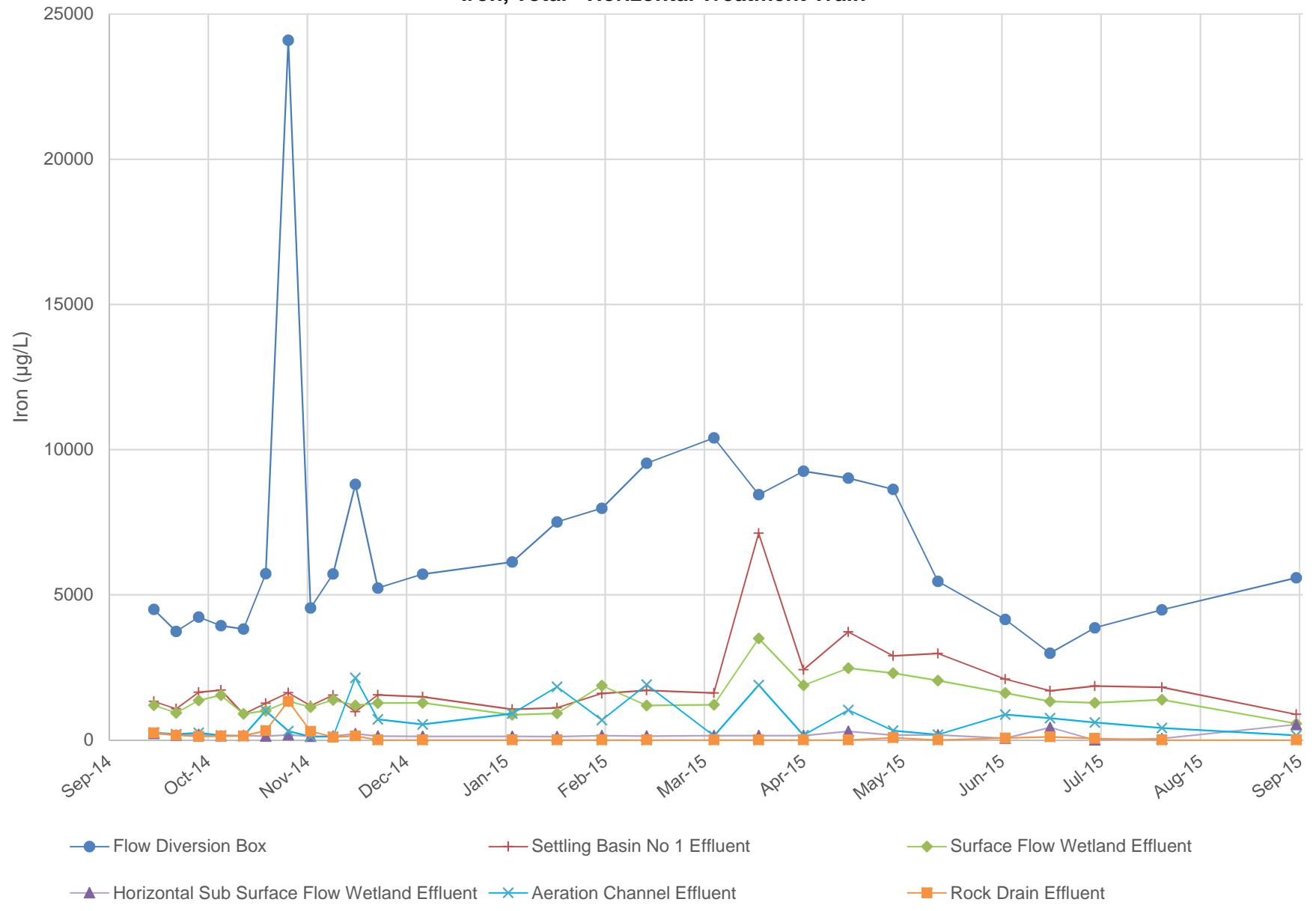
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## Key Performance Indicators Figures

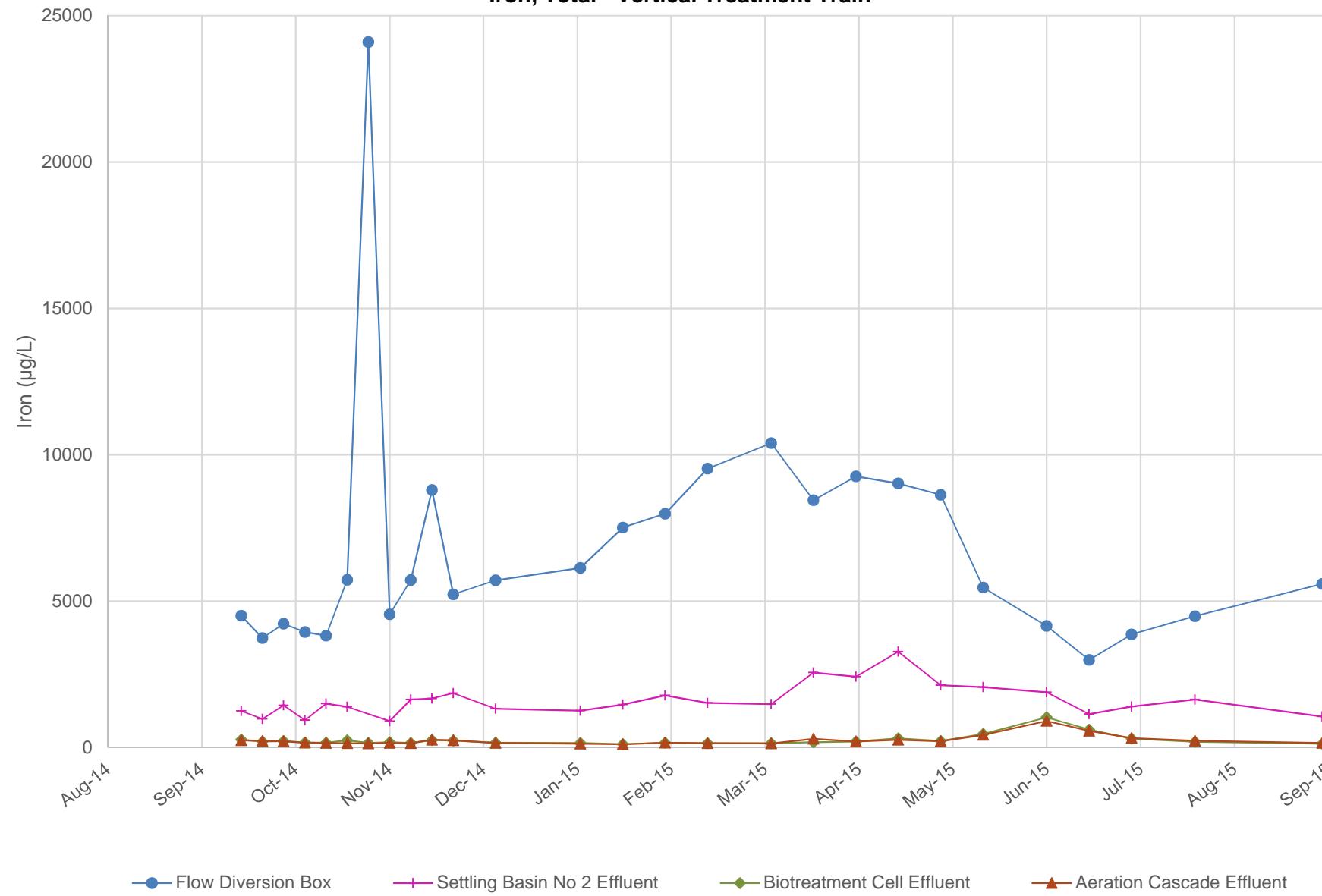
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

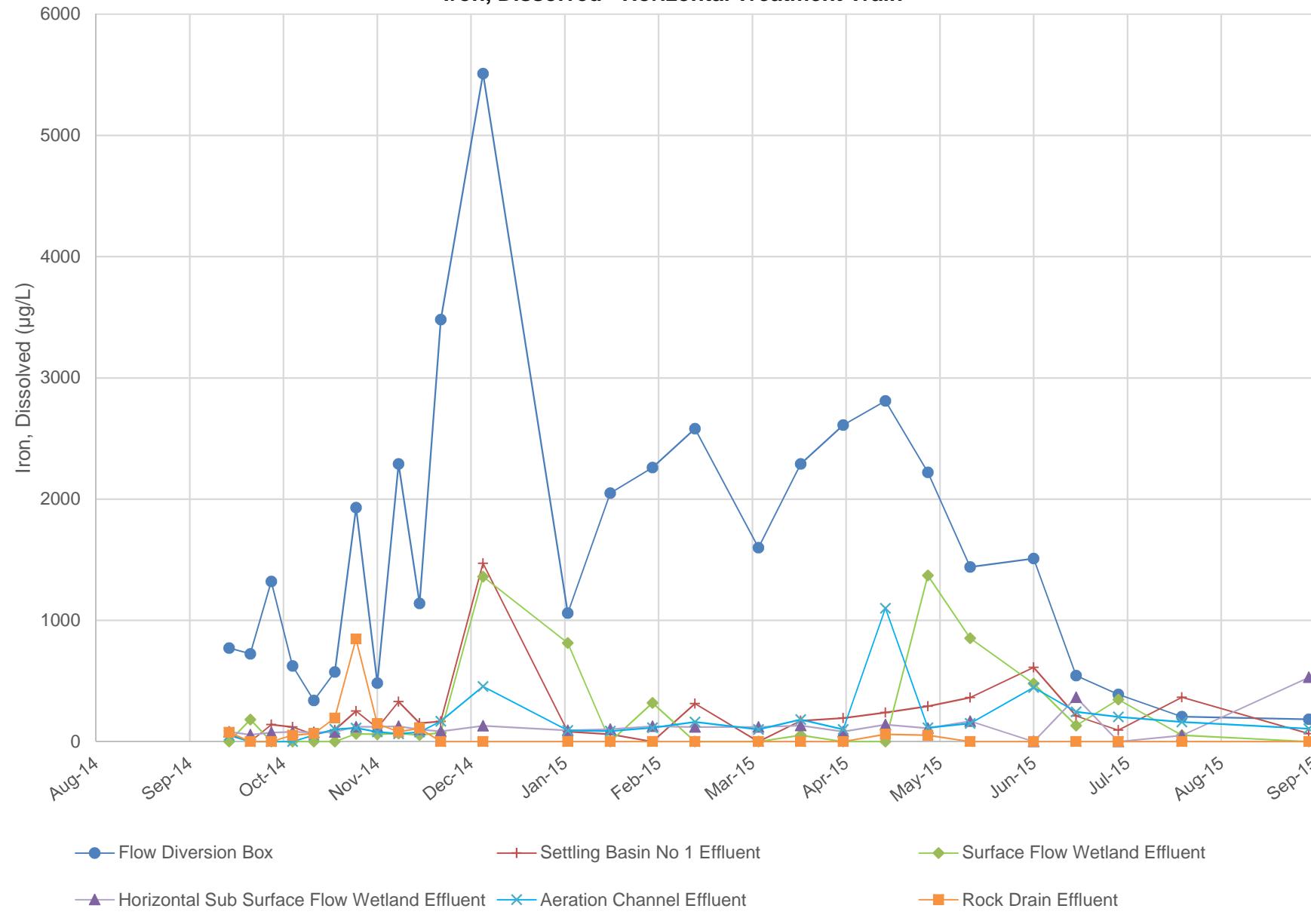
**Figure 1**  
**Iron, Total - Horizontal Treatment Train**



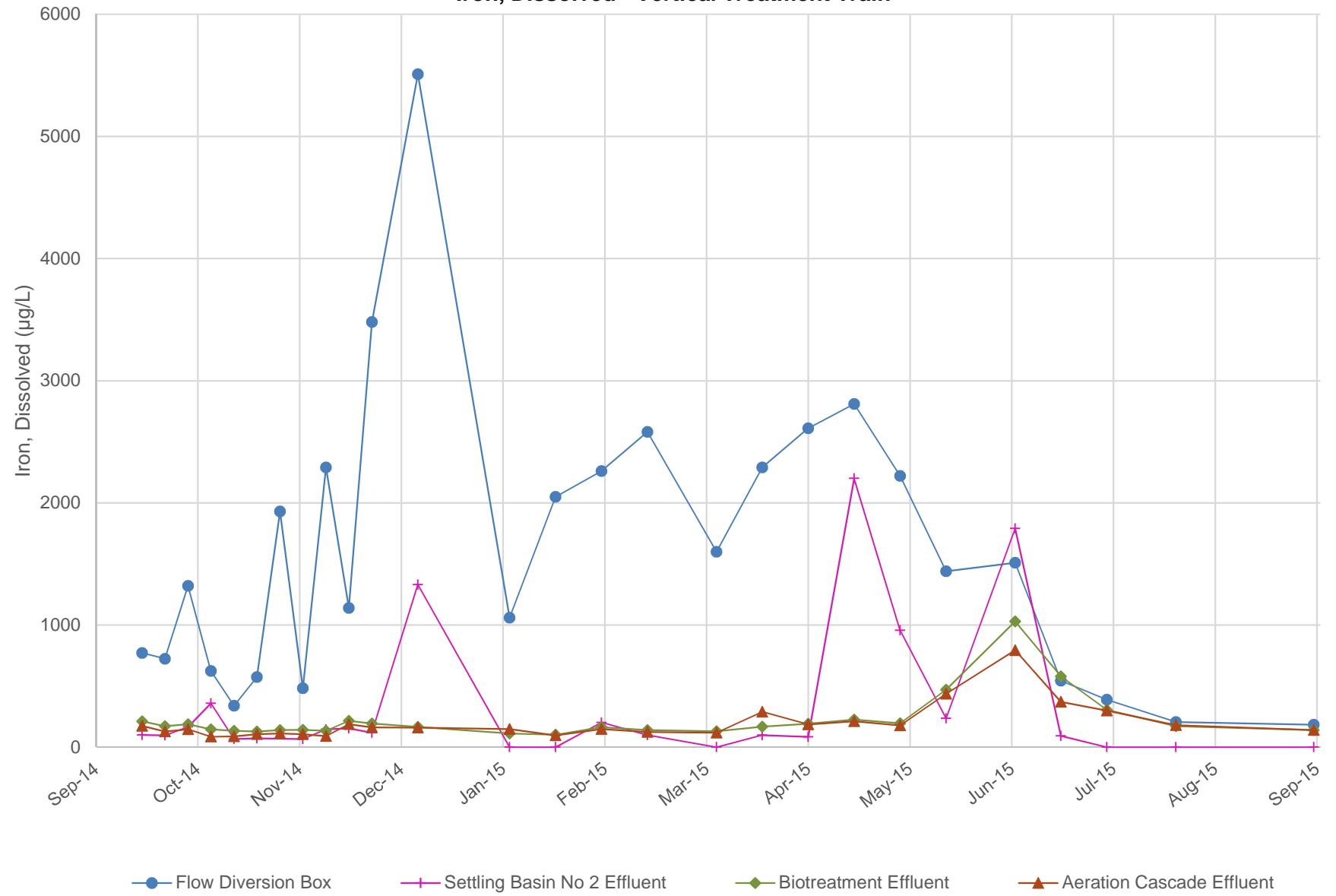
**Figure 2**  
**Iron, Total - Vertical Treatment Train**



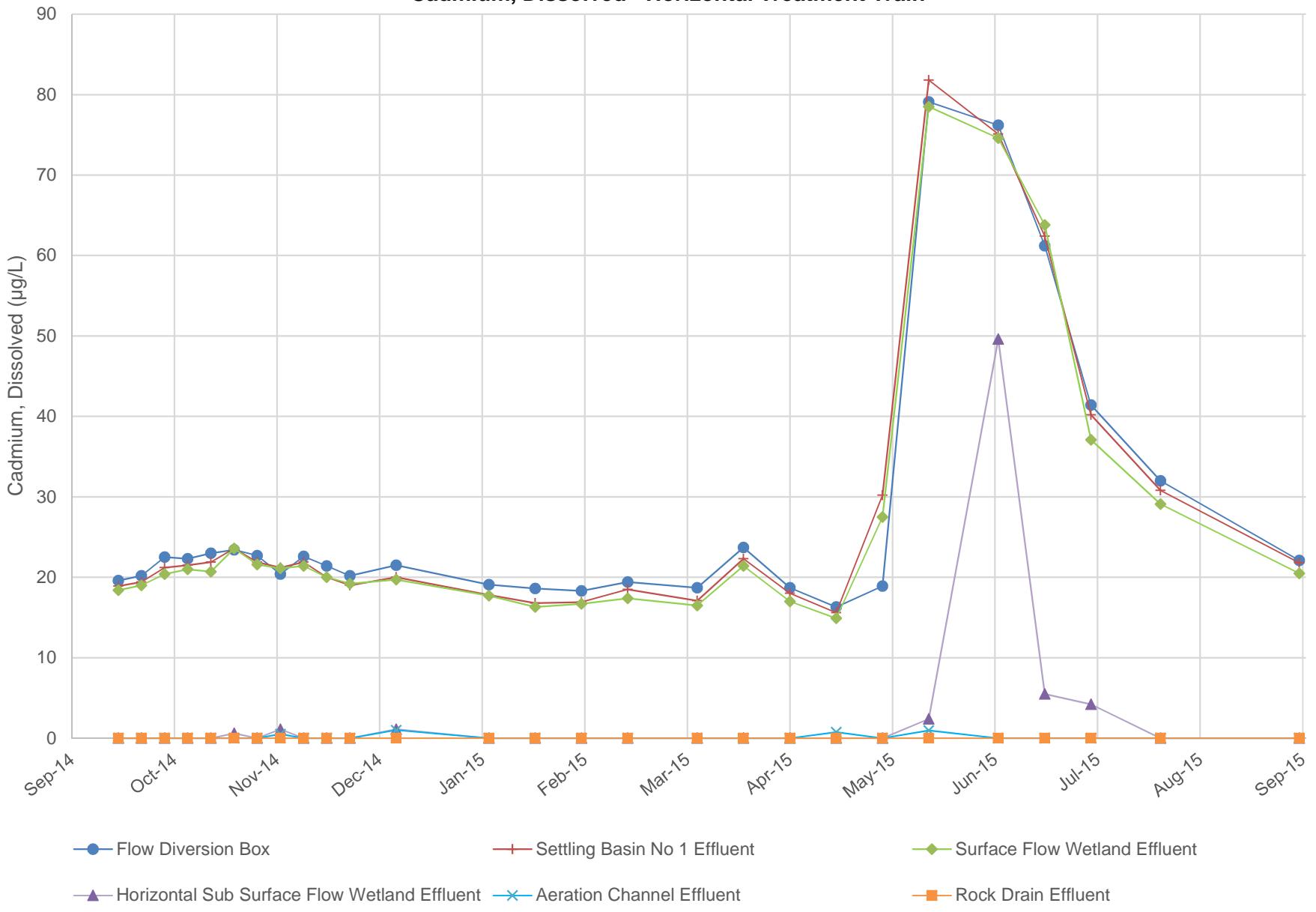
**Figure 3**  
**Iron, Dissolved - Horizontal Treatment Train**



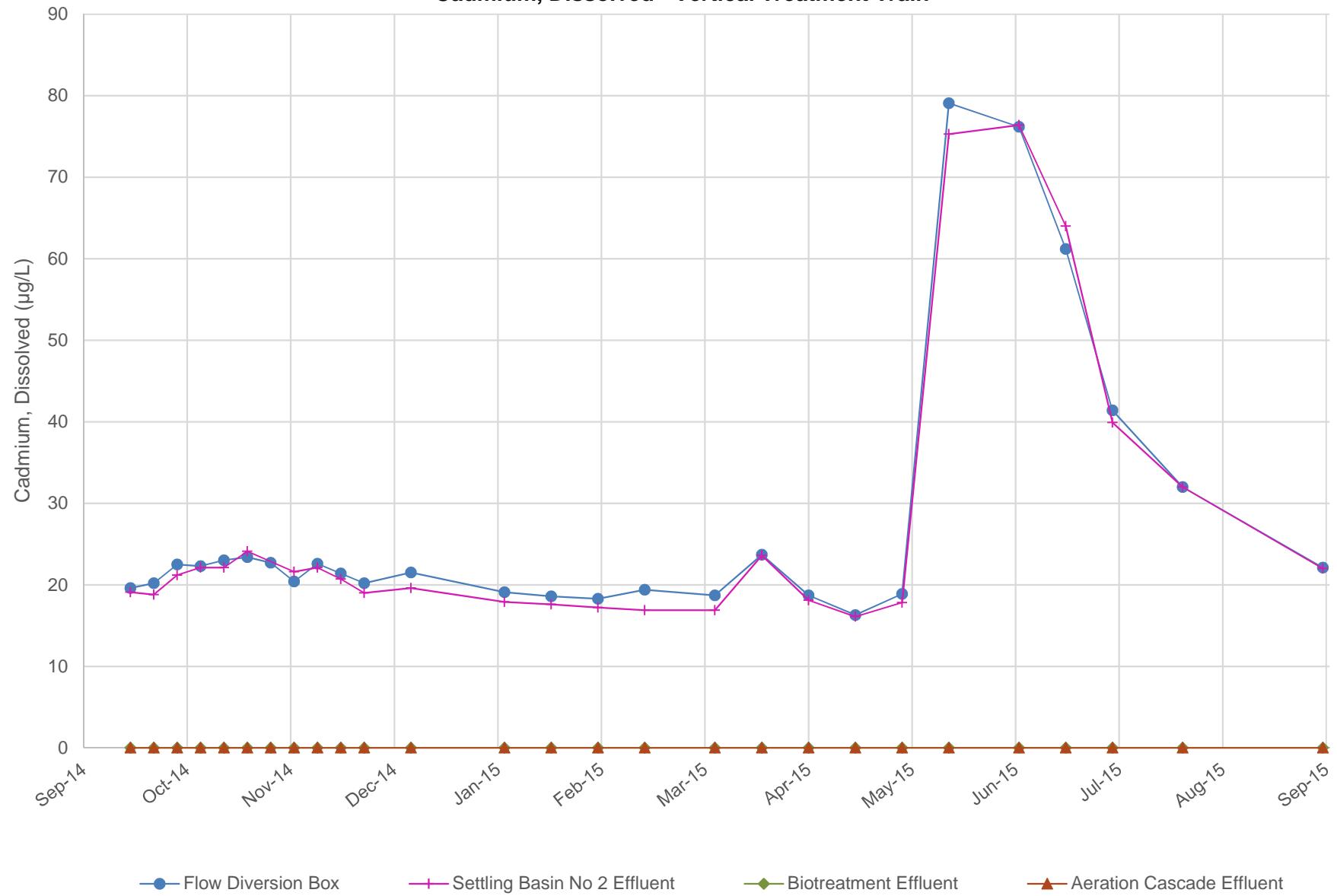
**Figure 4**  
**Iron, Dissolved - Vertical Treatment Train**



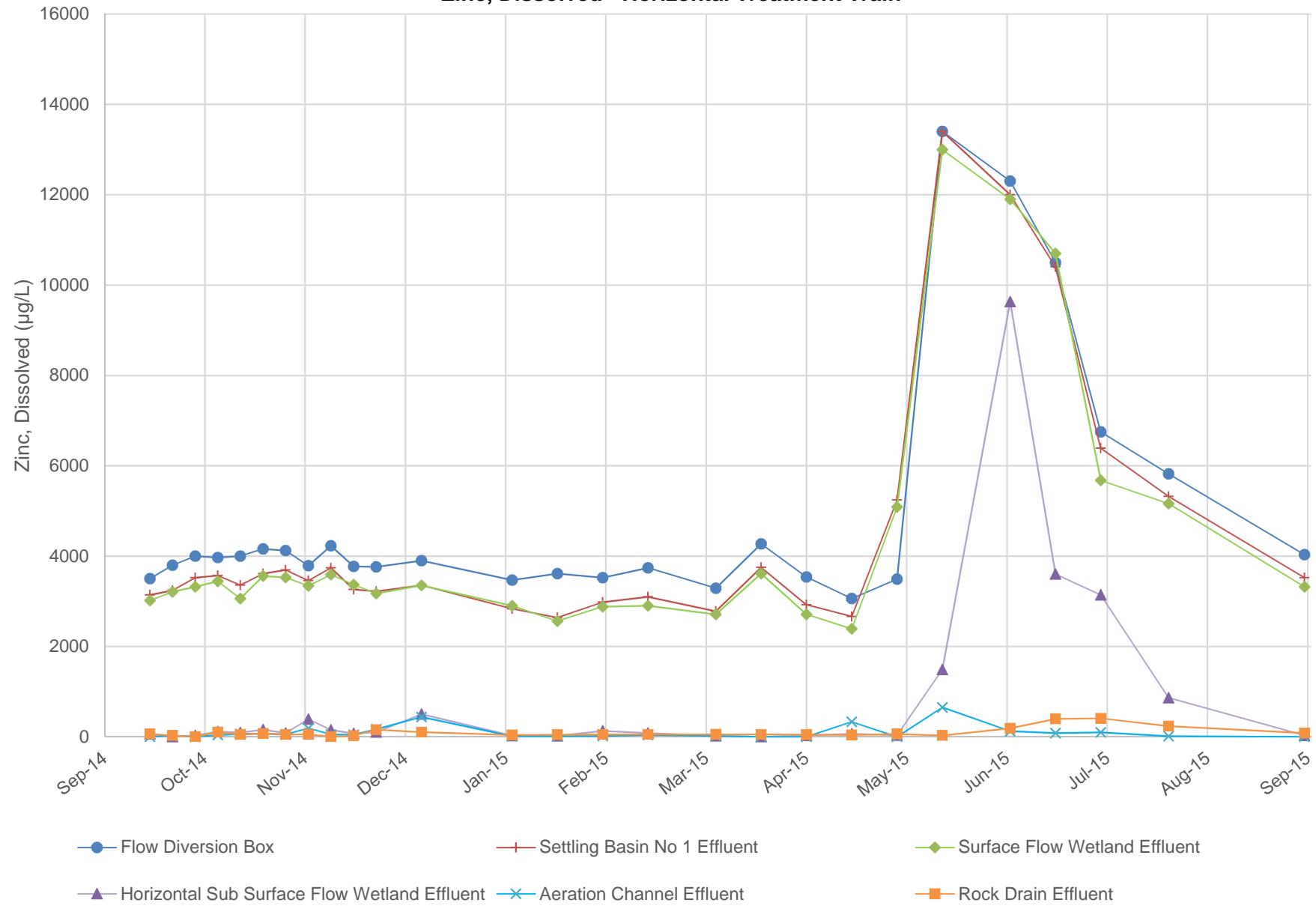
**Figure 5**  
**Cadmium, Dissolved - Horizontal Treatment Train**



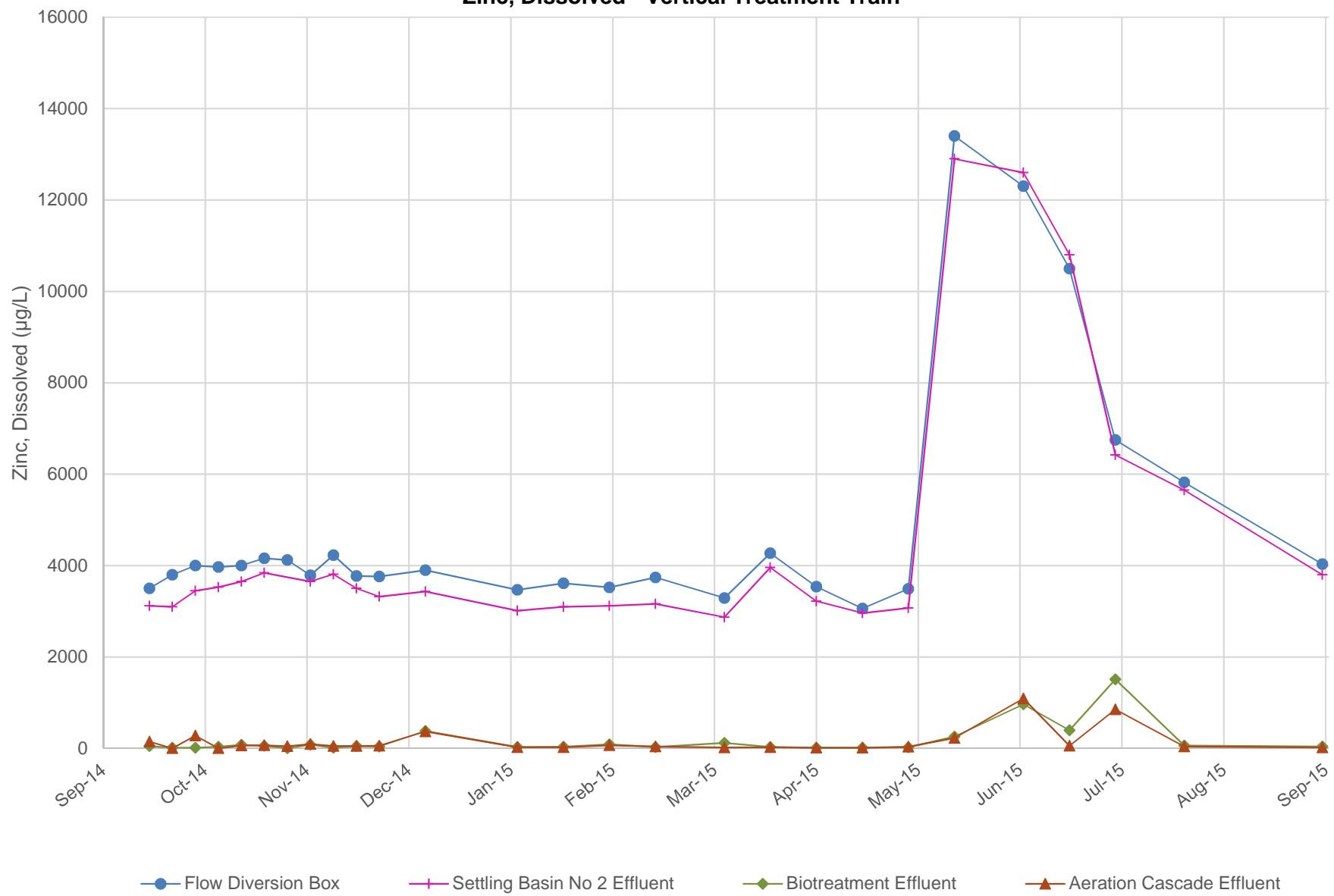
**Figure 6**  
**Cadmium, Dissolved - Vertical Treatment Train**



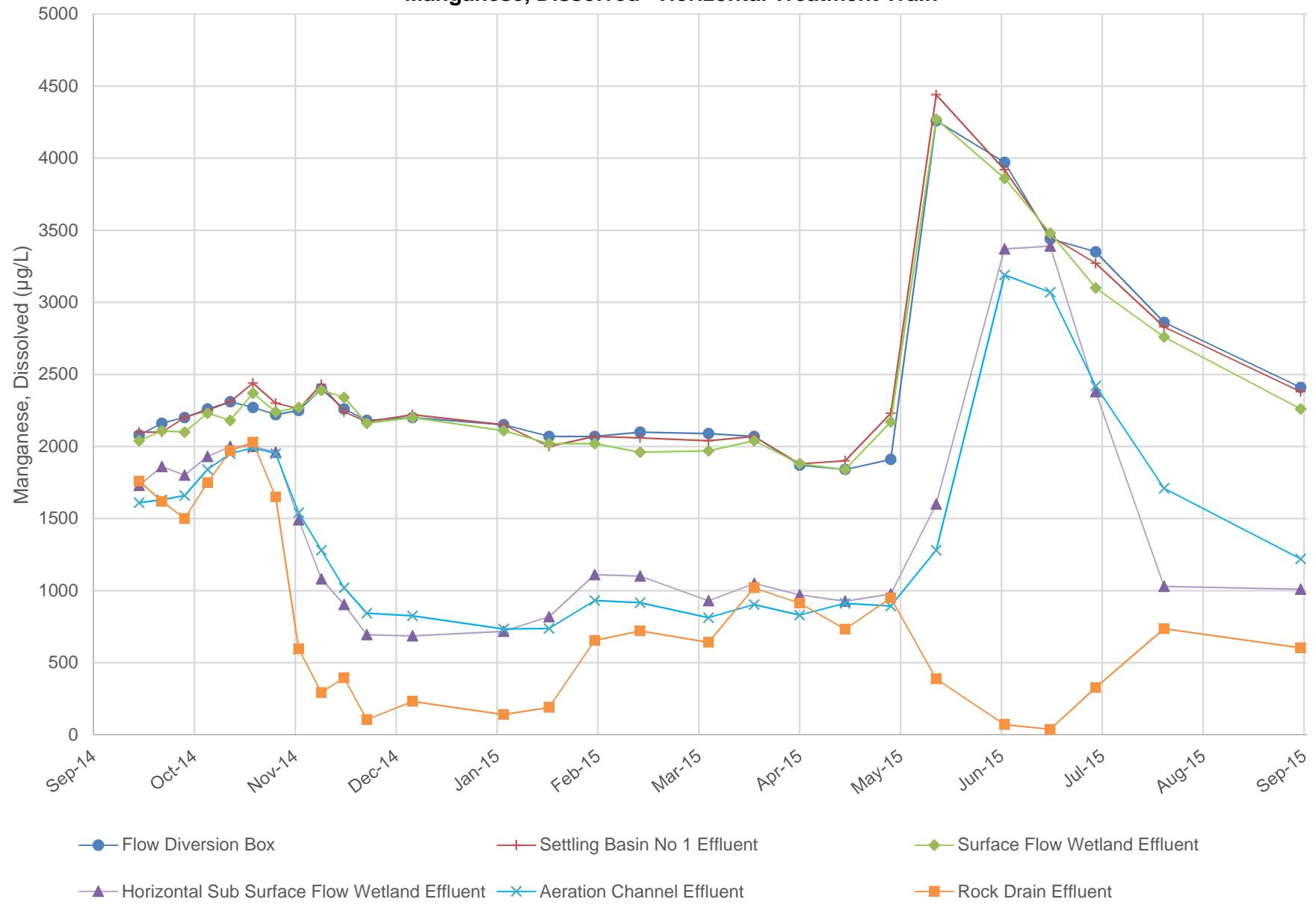
**Figure 7**  
**Zinc, Dissolved - Horizontal Treatment Train**



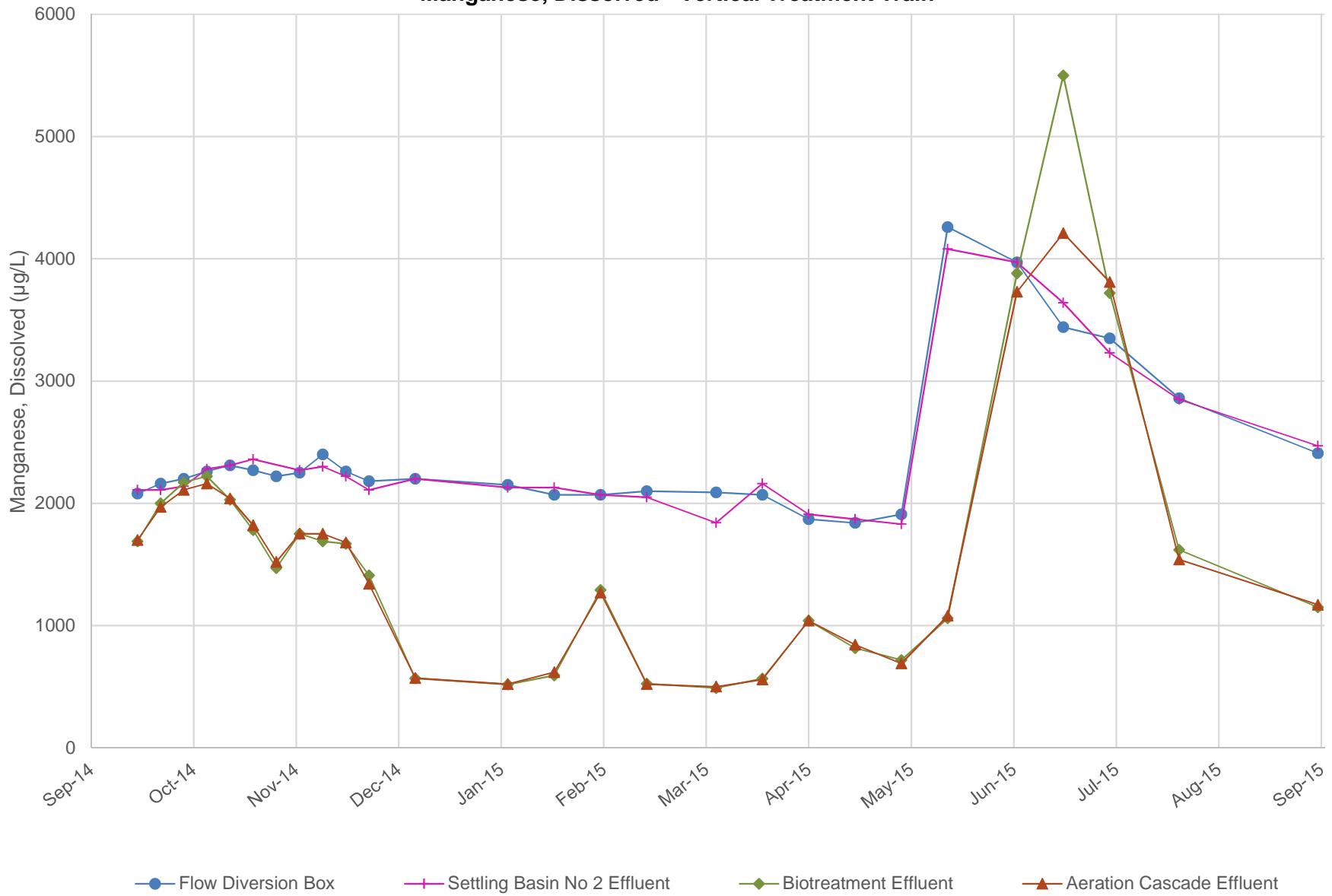
**Figure 8**  
**Zinc, Dissolved - Vertical Treatment Train**



**Figure 9**  
**Manganese, Dissolved - Horizontal Treatment Train**



**Figure 10**  
**Manganese, Dissolved - Vertical Treatment Train**



DRAWN BY: LPCjr  
 CHECKED: LPCjr  
 REVIEWED: KS  
 APPROVED: KS  
 JOB No: 1300  
 CAD FILE: Figure 4.dwg

DESCRIPTION

REV DATE

RESOURCE MANAGEMENT CONSULTANTS  
 SUITE 2A  
 MIDVALE, UT 84047  
 801-255-2626



RICO - ARGENTINE MINE SITE  
 ST LOUIS DISCHARGE CWDTS

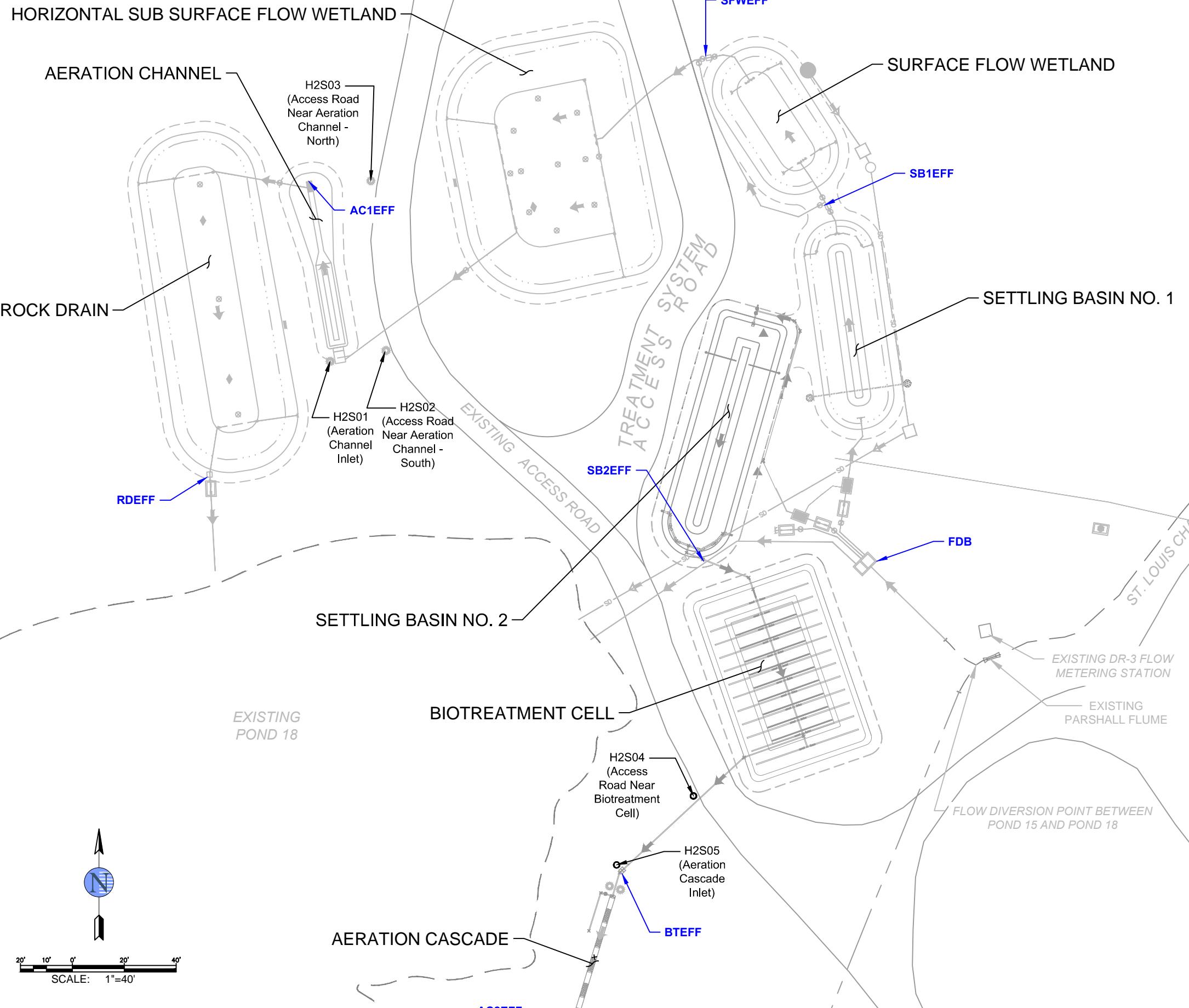
Monthly Progress Report  
 Monitoring Locations

AEEC

www.americanconsultants.com  
 3489 W 2100 S, Salt Lake City, UT 84119  
 801-908-5447 Fax 801-972-2741

DATE: 01 DEC 14  
 SCALE: 1:40  
 SHEET: 01 OF 01

Figure 11



20' 10' 0' 20' 40'

SCALE: 1"=40'

Key Performance Indicators Tables

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

**Table 1. Iron ( $\mu\text{g/L}$ )**

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>2</sup><br>(gpm) | FDB   | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF | AC2EFF |
|-------|------|-----------|------------------------------|------------------------------|-------|--------|--------|-----------|--------|-------|--------|-------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                         | 4500  | 1330   | 1200   | 223       | 261    | 250   | 1250   | 266   | 246    |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                         | 3740  | 1070   | 930    | 168       | 203    | 170   | 971    | 206   | 218    |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                         | 4230  | 1640   | 1360   | 194       | 250    | 129   | 1440   | 216   | 210    |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                         | 3940  | 1720   | 1540   | 142       | 156    | 134   | 937    | 171   | 165    |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                         | 3820  | 892    | 900    | 146       | 138    | 144   | 1500   | 161   | 154    |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                         | 5730  | 1260   | 1010   | 133       | 1010   | 326   | 1390   | 244   | 143    |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                         | 24100 | 1630   | 1330   | 171       | 304    | 1340  | R      | 157   | 137    |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                         | 4550  | 1180   | 1130   | 126       | 118    | 297   | 902    | 175   | 153    |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                         | 5720  | 1540   | 1380   | 137       | 115    | 99.6  | 1640   | 151   | 148    |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                         | 8800  | 978    | 1190   | 218       | 2140   | 141   | 1670   | 253   | 260    |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                         | 5230  | 1550   | 1270   | 135       | 712    | <50   | 1850   | 236   | 245    |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                         | 5710  | 1490   | 1280   | 129       | 538    | <50   | 1320   | 164   | 156    |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                         | 6130  | 1060   | 867    | 129       | 905    | <50   | 1260   | 151   | 131    |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                         | 7510  | 1110   | 920    | 117       | 1830   | <50   | 1460   | 116   | 109    |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W04  | 02-Feb-15 | 27                           | 32                           | 7980  | 1600   | 1870   | 150       | 688    | <50   | 1780   | 164   | 162    |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                         | 9530  | 1710   | 1190   | 136       | 1910   | <50   | 1520   | 143   | 142    |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                         | 10400 | 1620   | 1210   | 146       | 140    | <50   | 1480   | 148   | 138    |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                         | 8450  | 7120   | 3500   | 147       | 1890   | <50   | 2560   | 178   | 291    |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                           | 9260  | 2420   | 1880   | 153       | 164    | <50   | 2420   | 205   | 202    |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                         | 9020  | 3720   | 2480   | 300       | 1030   | <50   | 3270   | 309   | 261    |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                         | 8630  | 2900   | 2300   | 166       | 327    | 75.8  | 2130   | 218   | 210    |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                         | 5460  | 2980   | 2050   | 177       | 184    | <50   | 2060   | 457   | 425    |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                         | 4150  | 2100   | 1620   | 55.5      | 875    | 68.8  | 1890   | 1030  | 905    |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                         | 2990  | 1690   | 1330   | 428       | 750    | 106   | 1140   | 613   | 570    |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                         | 3860  | 1860   | 1280   | <50       | 603    | 53.9  | 1400   | 303   | 323    |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                         | 4480  | 1820   | 1390   | 54.8      | 417    | <50   | 1640   | 198   | 224    |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                         | NS    | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                         | 5590  | 883    | 565    | 531       | 155    | <50   | 1060   | 131   | 152    |

**NOTES:**

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = horizontal treatment train average flow rate

Flow V = vertical treatment train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

NS = not sampled

OU = operable unit

RDEFF = Rock Drain Effluent

R = rejected

RL = reporting limit

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Testing Phase Test Run

ug/L = microgram per liter

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup>The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup>The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

**Table 2. Iron, Dissolved (µg/L)**

Horizontal and Vertical Wetland Treatment Trains  
 St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study  
*Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU0;*

| Phase | Week | Week of   | FLOW H<br>(gpm) | FLOW V <sup>1/2</sup><br>(gpm) | FDB  | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF | AC2EFF |
|-------|------|-----------|-----------------|--------------------------------|------|--------|--------|-----------|--------|-------|--------|-------|--------|
| C     | W00  | 15-Sep-14 | 25.8            | 33.8                           | 772  | 56.4   | <50    | 80.7      | 50.8   | 76.2  | 101    | 213   | 174    |
| C     | W01  | 22-Sep-14 | 30.7            | 44.5                           | 723  | <50    | 182    | 56        | <50    | <50   | 96.2   | 172   | 128    |
| C     | W02  | 29-Sep-14 | 29.5            | 41.3                           | 1320 | 140    | <50    | 74.1      | <50    | <50   | 166    | 189   | 147    |
| C     | W03  | 06-Oct-14 | 30.2            | 35.1                           | 625  | 120    | <50    | 79.8      | <50    | 53.3  | 360    | 147   | 86.2   |
| C     | W04  | 13-Oct-14 | 26.8            | 35.7                           | 339  | 58.2   | <50    | 77        | 52.8   | 66.1  | 67     | 135   | 89.4   |
| C     | W05  | 20-Oct-14 | 29.2            | 35.9                           | 575  | 96     | <50    | 78.9      | 103    | 195   | 72.8   | 128   | 106    |
| C     | W06  | 27-Oct-14 | 27.7            | 43.2                           | 1930 | 252    | 64.6   | 123       | 113    | 847   | R      | 140   | 113    |
| C     | W07  | 03-Nov-14 | 28.8            | 32.0                           | 483  | 113    | 59.9   | 122       | 80.5   | 148   | 66.4   | 143   | 106    |
| C     | W08  | 10-Nov-14 | 27.9            | 29.8                           | 2290 | 329    | 67.6   | 126       | 64.4   | 79.8  | 147    | 134   | 90     |
| C     | W09  | 17-Nov-14 | 27.9            | 29.2                           | 1140 | 152    | 54.6   | 101       | 79.2   | 111   | 154    | 215   | 188    |
| C     | W10  | 24-Nov-14 | 27.0            | 29.2                           | 3480 | 167    | 73.4   | 85.4      | 168    | <50   | 119    | 194   | 163    |
| C     | W11  | 01-Dec-14 | 25.9            | 28.5                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W12  | 08-Dec-14 | 25.5            | 27.8                           | 5510 | 1470   | 1360   | 130       | 454    | <50   | 1330   | 167   | 161    |
| C     | W13  | 15-Dec-14 | 25.1            | 26.2                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W14  | 22-Dec-14 | 24.1            | 25.4                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W15  | 29-Dec-14 | 23.3            | 24.5                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W00  | 05-Jan-15 | 22.7            | 25.7                           | 1060 | 82.9   | 813    | 91.7      | 92     | <50   | <50    | 113   | 148    |
| TR01  | W01  | 12-Jan-15 | 21.6            | 27.3                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W02  | 19-Jan-15 | 20.4            | 25.9                           | 2050 | 60.4   | <50    | 103       | 86.9   | <50   | <50    | 102   | 95.6   |
| TR01  | W03  | 26-Jan-15 | 21.9            | 30.8                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W04  | 02-Feb-15 | 27.0            | 32.0                           | 2260 | <50    | 320    | 126       | 115    | <50   | 202    | 164   | 148    |
| TR01  | W05  | 09-Feb-15 | 27.8            | 30.3                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W06  | 16-Feb-15 | 28.7            | 29.4                           | 2580 | 314    | <50    | 120       | 163    | <50   | 97.9   | 141   | 124    |
| TR01  | W07  | 23-Feb-15 | 28.7            | 25.2                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W08  | 02-Mar-15 | 28.2            | 24.9                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W09  | 09-Mar-15 | 29.3            | 28.1                           | 1600 | <50    | <50    | 121       | 100    | <50   | <50    | 130   | 118    |
| TR01  | W10  | 16-Mar-15 | 29.5            | 29.7                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W11  | 23-Mar-15 | 34.9            | 36.4                           | 2290 | 173    | 52.9   | 133       | 182    | <50   | 99.2   | 168   | 289    |
| TR01  | W12  | 30-Mar-15 | 34.4            | 38.5                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W00  | 06-Apr-15 | 32.3            | 36                             | 2610 | 194    | <50    | 82.3      | 101    | <50   | 85.2   | 192   | 187    |
| TR02  | W01  | 13-Apr-15 | 38              | 39.8                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W02  | 20-Apr-15 | 36.7            | 39.3                           | 2810 | 240    | <50    | 141       | 1100   | 59.9  | 2200   | 226   | 213    |
| TR02  | W03  | 27-Apr-15 | 36.1            | 39.3                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W04  | 04-May-15 | 35.2            | 39.1                           | 2220 | 292    | 1370   | 111       | 114    | 52.2  | 956    | 197   | 179    |
| TR02  | W05  | 11-May-15 | 33.4            | 37.8                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W06  | 18-May-15 | 32.0            | 36.6                           | 1440 | 363    | 854    | 169       | 150    | <50   | 235    | 470   | 436    |
| TR02  | W07  | 25-May-16 | 31.9            | 36.2                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W08  | 01-Jun-15 | 31.3            | 35.7                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W09  | 08-Jun-15 | 30.9            | 35.3                           | 1510 | 612    | 479    | <50       | 447    | <50   | 1790   | 1030  | 794    |
| TR02  | W10  | 15-Jun-15 | 30.8            | 35.6                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W11  | 22-Jun-15 | 30.9            | 35.7                           | 544  | 213    | 133    | 366       | 246    | <50   | 92     | 580   | 371    |
| TR02  | W12  | 29-Jun-15 | 30.3            | 35.5                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W13  | 06-Jul-15 | 30.0            | 35.4                           | 389  | 94     | 348    | <50       | 204    | <50   | <50    | 306   | 300    |
| TR02  | W14  | 13-Jul-15 | 30.4            | 35.7                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W15  | 20-Jul-15 | 30.5            | 35.7                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W16  | 27-Jul-15 | 28.6            | 33.7                           | 206  | 366    | 52.2   | 50.5      | 163    | <50   | <50    | 173   | 181    |
| TR02  | W17  | 03-Aug-15 | 28.2            | 33.3                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W18  | 10-Aug-15 | 28.4            | 33.6                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W19  | 17-Aug-15 | 28.3            | 33.8                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W20  | 24-Aug-15 | 28.3            | 33.8                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W21  | 31-Aug-15 | 25.7            | 31.9                           | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W22  | 07-Sep-15 | 25.0            | 32.6                           | 184  | 65.1   | <50    | 530       | 106    | <50   | <50    | 140   | 141    |

**NOTES:**

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = horizontal treatment train average flow rate

Flow V = vertical treatment train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

J = Estimated result

NS = not sampled

OU = operable unit

R = rejected

RDEFF = Rock Drain Effluent

RL = reporting limit

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

µg/L = microgram per liter

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup> The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

<sup>2</sup> The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

Table 3. Cadmium, Dissolved ( $\mu\text{g/L}$ )

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>2</sup><br>(gpm) | FDB  | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF | AC2EFF |
|-------|------|-----------|------------------------------|------------------------------|------|--------|--------|-----------|--------|-------|--------|-------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                         | 19.6 | 18.9   | 18.4   | <0.5      | <0.5   | <0.5  | 19.1   | <0.5  | <0.5   |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                         | 20.2 | 19.4   | 19     | <0.5      | <0.5   | <0.5  | 18.8   | <0.5  | <0.5   |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                         | 22.5 | 21.2   | 20.4   | <0.5      | <0.5   | <0.5  | 21.2   | <0.5  | <0.5   |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                         | 22.3 | 21.5   | 21     | <0.5      | <0.5   | <0.5  | 22.1   | <0.5  | <0.5   |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                         | 23   | 21.9   | 20.7   | <0.5      | <0.5   | <0.5  | 22.1   | <0.5  | <0.5   |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                         | 23.4 | 23.6   | 23.6   | 0.6       | <0.5   | <0.5  | 24.1   | <0.5  | <0.5   |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                         | 22.7 | 21.9   | 21.6   | <0.5      | <0.5   | <0.5  | R      | <0.5  | <0.5   |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                         | 20.4 | 21.2   | 21.1   | 1.1       | 0.51   | <0.5  | 21.6   | <0.5  | <0.5   |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                         | 22.6 | 21.9   | 21.4   | <0.5      | <0.5   | <0.5  | 22.1   | <0.5  | <0.5   |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                         | 21.4 | 20     | 20     | <0.5      | <0.5   | <0.5  | 20.7   | <0.5  | <0.5   |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                         | 20.2 | 19     | 19.2   | <0.5      | <0.5   | <0.5  | 19     | <0.5  | <0.5   |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                         | 21.5 | 20     | 19.7   | 1.1       | 1      | <0.5  | 19.6   | <0.5  | <0.5   |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                         | 19.1 | 17.8   | 17.7   | <0.5      | <0.5   | <0.5  | 17.9   | <0.5  | <0.5   |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                         | 18.6 | 16.8   | 16.3   | <0.5      | <0.5   | <0.5  | 17.6   | <0.5  | <0.5   |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W04  | 02-Feb-15 | 27                           | 32                           | 18.3 | 16.9   | 16.7   | <0.5      | <0.5   | <0.5  | 17.2   | <0.5  | <0.5   |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                         | 19.4 | 18.5   | 17.4   | <0.5      | <0.5   | <0.5  | 16.9   | <0.5  | <0.5   |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                         | 18.7 | 17.1   | 16.5   | <0.5      | <0.5   | <0.5  | 16.9   | <0.5  | <0.5   |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                         | 23.7 | 22.3   | 21.4   | <0.5      | <0.5   | <0.5  | 23.6   | <0.5  | <0.5   |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                           | 18.7 | 18     | 17     | <0.5      | <0.5   | <0.5  | 18.1   | <0.5  | <0.5   |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                         | 16.3 | 15.6   | 14.9   | <0.5      | 0.75   | <0.5  | 16.1   | <0.5  | <0.5   |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                         | 18.9 | 30.2   | 27.5   | <0.5      | <0.5   | <0.5  | 17.8   | <0.5  | <0.5   |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                         | 79.1 | 81.8   | 78.5   | 2.4       | 0.96   | <0.5  | 75.3   | <0.5  | <0.5   |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                         | 76.2 | 75.1   | 74.6   | 49.6      | <0.5   | <0.5  | 76.4   | <0.5  | <0.5   |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                         | 61.2 | 62.4   | 63.8   | 5.5       | <0.5   | <0.5  | 64     | <0.5  | <0.5   |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                         | 41.4 | 40.2   | 37.1   | 4.2       | <0.5   | <0.5  | 39.9   | <0.5  | <0.5   |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                         | 32   | 30.8   | 29.1   | <0.08     | <0.08  | <0.08 | 32     | <0.08 | <0.08  |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                         | NS   | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                         | 22.1 | 21.8   | 20.5   | <0.5      | <0.5   | <0.5  | 22     | <0.5  | <0.5   |

**NOTES:**

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = horizontal treatment train average flow rate

Flow V = vertical treatment train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

NS = not sampled

OU = operable unit

R = rejected

RDEFF = Rock Drain Effluent

RL = reporting limit

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

 $\mu\text{g/L}$  = microgram per liter

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup> The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup> The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

**Table 4. Zinc, Dissolved (µg/L)**

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Stud

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU0.

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>12</sup><br>(gpm) | FDB    | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF  | BTEFF  | AC2EFF |
|-------|------|-----------|------------------------------|-------------------------------|--------|--------|--------|-----------|--------|-------|---------|--------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                          | 3500   | 3140   | 3020   | 60.6      | <10    | 62.5  | 3120    | 52 J   | 148    |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                          | 3800 J | 3240   | 3210   | <10       | 27     | 30    | 3100    | 12.8   | <10    |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                          | 4000   | 3520   | 3320   | 30.3      | <10    | <10   | 3450 J  | 10.8   | 279    |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                          | 3970   | 3570   | 3440   | 115       | 37.9   | 102   | 3530    | 32.7   | <10    |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                          | 4000   | 3360   | 3060   | 90.4      | 60.5   | 53    | 3650    | 76.2   | 59.4   |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                          | 4160   | 3610   | 3560   | 156       | 70     | 69.3  | 3840    | 56.4   | 65.7   |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                          | 4120   | 3690   | 3530   | 79.9      | 47.8   | 47.9  | R       | <10    | 46.9   |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                          | 3790   | 3460   | 3340   | 391       | 190    | 54    | 3650    | 83.3   | 91.7   |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                          | 4230   | 3740   | 3590   | 152       | 48.3   | <10   | 3810    | 15.2   | 49.4   |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                          | 3770   | 3260   | 3370   | 74        | 44.1   | 23.5  | 3500    | 50.5   | 48.8   |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                          | 3760   | 3220   | 3170   | 105       | 168    | 159   | 3320    | 41.8   | 54.5   |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                          | 3900   | 3350   | 3350   | 503       | 439    | 106   | 3430    | 380    | 368    |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                          | 3470   | 2830   | 2900   | 21.5      | 15.3   | 38.3  | 3010 J  | 26.9   | 26.1   |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                          | 3610   | 2640   | 2560   | 20.7      | 11.1   | 42.7  | 3100    | 33.5   | 25.3   |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR01  | W04  | 02-Feb-15 | 27                           | 32                            | 3520   | 2980   | 2880   | 129       | 20.5   | 52.9  | 3120    | 89.4   | 63.7   |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                          | 3740   | 3100   | 2900   | 84.8      | 38     | 48.5  | 3160    | 30.6   | 38.4   |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                          | 3290   | 2780   | 2710   | 19.1      | 16.6   | 57.1  | 2870 J  | 117    | 16.7   |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                          | 4270   | 3750   | 3610   | <10       | <10    | 52.4  | 3960    | 30.4   | 24.2   |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                            | 3540   | 2920   | 2710   | 28.2      | <10    | 44    | 3220    | 14.2   | 12.7   |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                          | 3060   | 2660   | 2390   | 68.3      | 333    | 38.2  | 2960    | 12.6   | 10.7   |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                          | 3490   | 5240   | 5090   | 32.6      | <10    | 62.2  | 3070    | 23.2   | 34.7   |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                          | 13400  | 13400  | 13000  | 1490 J    | 651    | 31.6  | 12900 J | 257    | 225    |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                          | 12300  | 12000  | 11900  | 9630      | 125    | 187   | 12600   | 961    | 1090   |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                          | 10500  | 10400  | 10700  | 3600      | 82.9   | 393   | 10800   | 398    | 54     |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                          | 6750   | 6390   | 5680   | 3140      | 96.2   | 408   | 6420    | 1510 J | 854    |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                          | 5820   | 5320 J | 5160   | 861       | 11     | 236   | 5650    | 62.8   | 38.2   |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                          | NS     | NS     | NS     | NS        | NS     | NS    | NS      | NS     | NS     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                          | 4030   | 3520   | 3320   | 27.4      | <10    | 83.1  | 3800    | 39.8   | 20     |

**NOTES:**

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = horizontal treatment train average flow rate

Flow V = vertical treatment train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

J = Estimated result

MDL = method detection limit

NS = not sampled

OU = operable unit

R = rejected

RDEFF = Rock Drain Effluent

RL = reporting limit

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

µg/L = microgram per liter

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup> The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup> The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

**Table 5. Manganese, Dissolved (µg/L)**

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU0

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>1,2</sup><br>(gpm) | FDB     | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF  | SB2EFF | BTEFF  | AC2EFF |
|-------|------|-----------|------------------------------|--------------------------------|---------|--------|--------|-----------|--------|--------|--------|--------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                           | 2080    | 2100   | 2040 J | 1730 J    | 1610   | 1760   | 2110   | 1690   | 1700   |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                           | 2160 J  | 2100   | 2110   | 1860 J    | 1630   | 1620   | 2110   | 2000   | 1970   |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                           | 2200    | 2200   | 2100   | 1800      | 1660   | 1500   | 2140 J | 2170 J | 2110   |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                           | 2260    | 2250   | 2230   | 1930      | 1840   | 1750 J | 2280   | 2220 J | 2160   |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                           | 2310 B  | 2310 B | 2180 B | 2000 B    | 1950 B | 1970 B | 2310 B | 2030 B | 2040 B |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                           | 2270    | 2440   | 2370   | 2000 J    | 1990   | 2030   | 2360   | 1780   | 1820   |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                           | 2220    | 2300   | 2240   | 1960      | 1950   | 1650 J | R      | 1470   | 1520   |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                           | 2250    | 2260   | 2270   | 1490      | 1540   | 594 J  | 2270   | 1750   | 1750   |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                           | 2400    | 2430   | 2390   | 1080      | 1280   | 293 J  | 2300 J | 1690 J | 1750   |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                           | 2260    | 2240   | 2340   | 904 J     | 1020   | 396 J  | 2220   | 1670   | 1680   |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                           | 2180    | 2170   | 2160   | 695 J     | 843    | 106 J  | 2110   | 1410   | 1340   |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                           | 2200    | 2220   | 2200   | 686       | 825    | 232    | 2200   | 568    | 571    |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                           | 2150    | 2150   | 2110   | 717       | 734    | 141    | 2130 J | 519    | 520    |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                           | 2070    | 2000   | 2020   | 819 J     | 737    | 190    | 2130   | 592 J  | 618    |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR01  | W04  | 02-Feb-15 | 27                           | 32                             | 2070    | 2070   | 2020   | 1110      | 931    | 654    | 2070   | 1290   | 1270   |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                           | 2100    | 2060   | 1960   | 1100      | 917    | 721    | 2050   | 525    | 521    |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                           | 2090    | 2040   | 1970   | 930 J     | 812    | 641    | 1840 J | 489    | 500    |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                           | 2070    | 2070   | 2040   | 1050 J    | 904    | 1020   | 2160   | 566    | 558    |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                             | 1870 B  | 1880 B | 1880 B | 969 B     | 830 B  | 913 B  | 1910 B | 1040 J | 1040 B |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                           | 1840    | 1900   | 1840   | 927       | 912    | 732 J  | 1870   | 816    | 844 J  |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                           | 1910    | 2230   | 2170   | 976       | 893    | 949    | 1830   | 718    | 689    |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                           | 4260    | 4440   | 4270   | 1600 J    | 1280   | 387    | 4080 J | 1060   | 1080   |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                           | 3970    | 3920   | 3860   | 3370      | 3190 J | 69.8   | 3970   | 3880   | 3730   |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                           | 34440 B | 3460 B | 3480 B | 3390 B    | 3070 J | 37.9 B | 3640 B | 5500 B | 4210 B |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                           | 3350    | 3270   | 3100   | 2380      | 2420   | 328    | 3230   | 3720 J | 3810   |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                           | 2860    | 2830 J | 2760   | 1030      | 1710   | 736    | 2850   | 1620   | 1540   |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                           | NS      | NS     | NS     | NS        | NS     | NS     | NS     | NS     | NS     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                           | 2410    | 2380   | 2260   | 1010      | 1220   | 603    | 2470   | 1150   | 1170   |

**NOTES:**

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

B = Analyte is detected in an associated blank

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = horizontal treatment train average flow rate

Flow V = vertical treatment train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

J = Estimated result

MDL = method detection limit

NS = not sampled

OU = operable unit

R = rejected

RDEFF = Rock Drain Effluent

RL = reporting limit

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\* = Test Run

µg/L = microgram per liter

VWTT = Vertical Well Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup> The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup> The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

Table 6. Total Suspended Solids (mg/L)

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>1,2</sup><br>(gpm) | FDB | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF | AC2EFF |
|-------|------|-----------|------------------------------|--------------------------------|-----|--------|--------|-----------|--------|-------|--------|-------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                           | 6   | <5     | <5     | <5        | <5     | <5    | <5     | <5    | <5     |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                           | 6   | 12     | <5     | <5        | 6      | <5    | <5     | <5    | <5     |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                           | 8   | <5     | 6      | <5        | 10     | <5    | 9      | <5    | <5     |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                           | <5  | <5     | 6      | <5        | <5     | <5    | <5     | <5    | <5     |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                           | 11  | 10     | 14     | <5        | 5      | <5    | 15     | <5    | <5     |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                           | 17  | 7      | 9      | <5        | 22     | <5    | 12     | 6     | 12     |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                           | <5  | 7      | <5     | <5        | <5     | 5     | R      | <5    | <5     |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                           | 11  | 6      | 8      | <5        | <5     | <5    | <5     | <5    | <5     |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                           | <5  | 7      | 6      | <5        | <5     | <5    | 11     | 5     | 10     |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                           | 12  | 13     | 15     | 80        | 30     | 11    | 15     | <5    | 14     |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                           | 42  | 10     | 7      | <5        | 15     | <5    | 7      | 6     | 14     |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                           | 14  | 9      | <5     | <5        | <5     | <5    | <5     | <5    | <5     |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                           | 9   | 6      | 9      | 7         | 10     | 8     | <5     | 7     | 8      |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                           | 16  | 5      | 6      | <5        | 18     | <5    | 6      | <5    | <5     |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W04  | 02-Feb-15 | 27                           | 32                             | 20  | 11     | 10     | <5        | 14     | 6     | <5     | <5    | <5     |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                           | 24  | 12     | 6      | 5         | 8      | <5    | 6      | <5    | <5     |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                           | 29  | 10     | 11     | 6         | 8      | 5     | <5     | 9     | 7      |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                           | 28  | 38     | 19     | 11        | 53     | 9     | 15     | 9     | 18     |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                             | 13  | 7      | 7      | <5        | 6      | <5    | <5     | 8     | 9      |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                           | 17  | 14     | <5     | <5        | <5     | 6     | 8      | <5    | 7      |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                           | 27  | <5     | 6      | <5        | 10     | <5    | 10     | 7     | 7      |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                           | 16  | 5      | 11     | <5        | <5     | R     | <5     | <5    | <5     |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                           | 6   | 6      | 6      | <5        | 7      | <5    | <5     | 6     | 6      |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                           | 8   | 10     | <5     | 5         | 5      | <5    | 10     | 6     | 6      |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                           | 12  | 9      | <5     | <5        | 9      | <5    | 5      | 13    | 12     |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                           | 10  | 10     | 6      | <5        | 6      | <5    | 6      | <5    | <5     |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                           | 17  | 8      | 10     | 7         | <5     | 5     | 10     | 6     | <5     |

**NOTES:**

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = Horizontal Treatment Train average flow rate

Flow V = Vertical Treatment Train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

mg/L = milligram per liter

NS = not sampled

OU = operable unit

R = rejected

RDEFF = Rock Drain Effluent

RL = reporting limit

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup> The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup> The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

Table 7. Total Organic Carbon (mg/L)

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Stud

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU0.

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>2</sup><br>(gpm) | FDB | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF | AC2EFF |
|-------|------|-----------|------------------------------|------------------------------|-----|--------|--------|-----------|--------|-------|--------|-------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                         | NR  | <1     | <1     | 12.7      | 24.9   | 21.5  | <1     | 38    | 31.6   |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                         | NR  | 1.3    | <1     | 6.8       | 11.7   | 12.5  | 1      | 21    | 19.7   |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                         | NR  | <1     | <1     | 5.9       | 9      | 9.1   | 1.3    | 10.6  | 9.2    |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                         | NR  | <1     | <1     | 4.2       | 7.4    | 7.6   | <1     | 9.2   | 7.8    |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                         | NR  | <1     | <1     | 3.2       | 4.9    | 5.2   | 1.1    | 6.2 J | 5.3    |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                         | NR  | <1     | <1     | 3         | 4.2    | 4.4   | <1     | 4.6   | 4.4    |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                         | NR  | <1     | <1     | 2.9       | 4      | 6.5   | R      | 3.5   | 3.3    |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                         | NR  | <1     | <1     | 1.6       | 2.6    | 2.5   | <1     | 2.6   | 2.6    |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                         | NR  | <1     | <1     | 1.6       | 2.5    | 2.1   | <1     | 2.4   | 2.4    |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                         | NR  | <1     | <1     | 1.7       | 2.5    | 2     | <1     | 2.5   | 2.4    |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                         | NR  | <1     | <1     | 1.3       | 2.2    | 1.5   | <1     | 2.3   | 2.5    |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                         | NR  | <1     | 1.8    | 1.8       | 2.8    | 1.6   | <1     | 2     | 1.9    |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                         | NR  | <1     | <1     | 1.5       | 2.4    | 1.4 J | <1     | 1.9   | 2.1    |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                         | NR  | <1     | <1     | 1.3       | 1.7    | 1.2 J | <1     | 1.6   | 1.7    |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W04  | 02-Feb-15 | 27                           | 32                           | NR  | <1     | <1     | 1.3       | 1.6    | 1.3   | <1     | 1.9   | 2.6    |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                         | NR  | <1     | <1     | 1.2       | 1.3    | 1.1   | <1     | 1.1   | 1.2    |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                         | NR  | <1     | <1     | 1.1       | 1.6    | 1.3   | <1     | 1.3   | 1.4    |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                         | NR  | <1     | <1     | <1        | 1.4    | 1.2   | <1     | 1.9   | 2.4    |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                           | NR  | <1     | <1     | <1        | 1.1    | <1    | <1     | <1    | <1     |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                         | NR  | <1     | <1     | 2.7       | 1.1    | <1    | <1     | <1    | 1      |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                         | NR  | <1     | <1     | <1        | 1.5    | 1.7   | <1     | 1.4   | 1.3    |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                         | NR  | <1     | <1     | <1        | 1.1    | <1    | <1     | <1    | <1     |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                         | NR  | <1     | <1     | 1.1       | 3      | 2.4   | <1     | 1.1   | 1.3    |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                         | NR  | <1     | <1     | 1.6       | 2.3    | 1.5   | <1     | 1.1   | 1.1    |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                         | NR  | <1     | <1     | 1.4       | 2.7    | 1.8   | <1     | 1.1   | 1      |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                         | NR  | <1     | <1     | <1        | 2      | 1.4   | <1     | <1    | <1     |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                         | NR  | <1     | <1     | <1        | 1.6    | 1.2   | <1     | <1    | <1     |

**NOTES:**

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = Horizontal Treatment Train average flow rate

Flow V = Vertical Treatment Train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

J = Estimated result

MDL = method detection limit

mg/L = milligram per liter

NR = not required

NS = not sampled

OU = operable unit

R = rejected

RDEFF = Rock Drain Effluent

RL = reporting limit

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup> The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup> The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

Table 8. Biological Oxygen Demand, 5 day (mg/L)

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OUO;

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>2</sup><br>(gpm) | FDB | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF           | AC2EFF          |
|-------|------|-----------|------------------------------|------------------------------|-----|--------|--------|-----------|--------|-------|--------|-----------------|-----------------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                         | NR  | <2     | <2     | 29.3      | R      | R     | <2     | 77.4            | 53.4            |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                         | NR  | <2     | <2     | 22.1      | 30.3   | 18.8  | <2     | 29.3            | 28.1            |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                         | NR  | <2     | <2     | 9.4       | 23.8   | 10.3  | <2     | 20.3            | 10.9            |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                         | NR  | <2     | <2     | 7.8       | 15.7   | 9.7   | <2     | 20.1            | 12.6            |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                         | NR  | <2     | <2     | 2.8       | 7.6    | 4.5   | <2     | 16.4            | 17.2            |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                         | NR  | <2     | <2     | <2        | 3.5    | 2.6   | <2     | 10.9            | 15.7            |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                         | NR  | <2     | <2     | 3.1       | 2      | <2    | <2     | 11.5            | 8.4             |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                         | NR  | <2     | <2     | 2         | 2.6    | 2.3   | <2     | 8               | 4.7             |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                         | NR  | <2     | <2     | 2.1       | 2      | <2    | <2     | 9.7             | 3.5             |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                         | NR  | <2     | <2     | 2.9       | <2     | 2     | <2     | 9.6             | 6.4             |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                         | NR  | <2     | <2     | 3.2       | 4.2    | <2    | <2     | 7.8             | 4.2             |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                         | NR  | <2     | <2     | 5.1       | 3.8    | <2    | <2     | 6.5             | 2.6             |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                         | NR  | <2     | <2     | 5.1       | 2.4    | <2    | <2     | 3.6             | 2.4             |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                         | NR  | <2     | <2     | 4.9       | 3.1    | <2    | <2     | 5.2             | <2              |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR01  | W04  | 02-Feb-15 | 27                           | 32                           | NR  | <2     | <2     | 7.6       | 6.3    | <2    | <2     | 5.3             | 3.1             |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                         | NR  | <2     | <2     | <2        | 2.1    | <2    | <2     | 4.4             | <2              |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                         | NR  | <2     | <2     | 6.4       | 2      | <2    | <2     | 4.8             | 2.6             |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                         | NR  | <2     | <2     | 2.3       | 6      | <2    | <2     | 3.7             | 2.9             |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                           | NR  | <2     | <2     | 3.2       | <2     | <2    | <2     | 2.8             | <2              |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                         | NR  | <2     | <2     | 2.5       | <2     | <2    | <2     | 3               | <2              |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                         | NR  | <2     | <2     | <2        | <2     | <2    | <2     | 2.1             | <2              |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                         | NR  | <2     | <2     | <2        | R      | <2    | <2     | <2              | <2              |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                         | NR  | <2     | <2     | <2        | <2     | <2    | <2     | <2              | <2              |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                         | NR  | <2     | <2     | <2        | 2.4    | <2    | <2     | 3.2             | <2              |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                         | NR  | <2     | <2     | 2         | 2.1    | <2    | <2     | 2.5             | <2              |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                         | NR  | <2     | <2     | <2        | <2     | <2    | <2     | <2              | <2              |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | NS              | NS              |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                         | NR  | <2     | <2     | 3         | 2.7    | <2    | <2     | NS <sup>3</sup> | NS <sup>3</sup> |
| TR02  | W23  | 14-Sep-15 | 28.0                         | 37.4                         | NR  | NS     | NS     | NS        | NS     | NS    | NS     | <2              | <2              |

**NOTES:**

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = Horizontal Treatment Train average flow rate

Flow V = Vertical Treatment Train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

mg/L = milligram per liter

NR = not required

NS = not sampled

OU = operable unit

R = rejected

RDEFF = Rock Drain Effluent

RL = reporting limit

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup> The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup> The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.<sup>3</sup>Samples were canceled due to expired hold times caused by shipping delays. Resamples were collected on 14 SEP 2015.

**Table 9. Sulfate (mg/L)**

Horizontal and Vertical Wetland Treatment Trains  
 St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study  
*Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01*

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>1,2</sup><br>(gpm) | FDB | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF | AC2EFF |
|-------|------|-----------|------------------------------|--------------------------------|-----|--------|--------|-----------|--------|-------|--------|-------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                           | 595 | 579    | 575    | 603       | 551    | 571   | 571    | 497   | 523    |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                           | 710 | 650    | 724    | 637       | 620    | 555 J | 589    | 582   | 656    |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                           | 574 | 615    | 612    | 605       | 587    | 565   | 613    | 573   | 580 J  |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                           | 570 | 630    | 618    | 707       | 580    | 618   | 622    | 522   | 562    |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                           | 632 | 637    | 647    | 660       | 655    | 648   | 644    | 615 J | 612    |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                           | 555 | 551    | 584    | 558       | 557    | 574   | 545    | 543   | 552    |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                           | 629 | 614    | 596    | 625       | 637    | 673   | R      | 602   | 606    |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                           | 536 | 514    | 526    | 552       | 542    | 535   | 536    | 530   | 525    |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                           | 616 | 623    | 640    | 617       | 644    | 815   | 627    | 646   | 657    |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                           | 601 | 635    | 584    | 587 J     | 901    | 683   | 606    | 591   | 574    |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                           | 638 | 662    | 636    | 685       | 749    | 680   | 654    | 674   | 638    |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                           | 645 | 623    | 633    | 672       | 687    | 614   | 663    | 597   | 625    |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                           | 673 | 646    | 707    | 631       | 668    | 701   | 652    | 648   | 645    |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                           | 670 | 565    | 582    | 596       | 600    | 617   | 678    | 639   | 801 J  |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W04  | 02-Feb-15 | 27                           | 32                             | 650 | 608    | 623    | 617       | 612    | 609   | 583    | 652   | 653    |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                           | 601 | 664    | 637    | 661       | 709    | 670   | 687    | 642   | 656    |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                           | 613 | 629    | 658    | 631       | 629    | 626   | 703 J  | 639   | 594    |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                           | 672 | 654    | 760    | 703       | 678    | 672   | 659    | 639   | 631    |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                             | 613 | 703    | 685    | 674       | 631    | 678   | 678    | 648   | 604 J  |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                           | 616 | 623    | 623    | 631       | 641    | 637   | 631    | 625   | 637    |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                           | 660 | 640    | 646    | 636       | 748    | 630   | 606    | 601   | 595    |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                           | 718 | 712    | 716    | 708       | 705    | R     | 708    | 682   | 725    |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                           | 688 | 692    | 748    | 711       | 689    | 760   | 689    | 664   | 675    |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                           | 638 | 644    | 638    | 639       | 633    | 638   | 631    | 624   | 661    |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                           | 615 | 600    | 573    | 604       | 571    | 564   | 619    | 600   | 594    |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                           | 519 | 523    | 528    | 526       | 529    | 530   | 520    | 524   | 524    |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                           | NS  | NS     | NS     | NS        | NS     | NS    | NS     | NS    | NS     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                           | 532 | 550    | 570    | 550       | 545    | 507   | 524    | 513   | 513    |

**NOTES:**

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = Horizontal Treatment Train average flow rate

Flow V = Vertical Treatment Train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

J = Estimated result

MDL = method detection limit

OU = operable unit

R = rejected

RDEFF = Rock Drain Effluent

RL = reporting limit

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup> The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

<sup>2</sup> The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

**Table 10. Turbidity (NTU)**

Horizontal and Vertical Wetland Treatment Trains  
 St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study  
*Rico-Argentine Mine Site - Rico Tunnels, Operable Unit OU01*

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>1,2</sup><br>(gpm) | FDB | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF | AC2EFF |
|-------|------|-----------|------------------------------|--------------------------------|-----|--------|--------|-----------|--------|-------|--------|-------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                           | 18  | 3      | 5      | R         | 44     | 7     | 8      | R     | R      |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                           | 18  | 7      | 4      | 11        | 49     | 13    | 4      | 3     | 13     |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                           | 22  | 8      | 7      | 8         | 35     | 35    | 7      | 7     | 16     |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                           | NM  | 7      | 6      | 9         | 32     | 48    | 5      | 6     | 26     |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                           | 31  | 8      | 7      | 14        | 56     | 47    | 12     | 7     | 35     |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                           | 39  | 9      | 8      | 11        | 60     | 14    | 11     | 9     | 103    |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                           | 38  | 9      | 6      | 7         | 33     | 14    | 5      | 5     | 38     |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                           | 38  | 9      | 8      | 5         | 21     | 3     | 6      | 3     | 28     |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                           | 31  | 5      | 6      | 2         | 25     | 0     | 4      | 5     | 19     |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                           | 30  | 8      | 7      | 5         | 23     | 2     | 8      | 5     | 25     |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                           | 46  | 59     | 17     | 8         | 43     | 1     | 7      | 17    | 146    |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                           | 33  | 7      | 6      | 2         | 31     | 0     | 8      | 5     | 44     |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                           | 33  | 12     | 4      | 4         | 38     | 1     | 14     | 3     | 37     |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                           | 31  | 40     | 4      | 3         | 47     | 1     | 16     | 3     | 33     |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W04  | 02-Feb-15 | 27                           | 32                             | 29  | 9      | 6      | 4         | 44     | 3     | 9      | 4     | 22     |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                           | 38  | 11     | 6      | 4         | 50     | 2     | 6      | 3     | 23     |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                           | 45  | 6      | 4      | 3         | 41     | 3     | 5      | 1     | 23     |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                           | 42  | 42     | 19     | 5         | 78     | 1     | 12     | 4     | 22     |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                             | 32  | 14     | 24     | 4         | 26     | 0     | 14     | 3     | 14     |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                           | 28  | 16     | 11     | 4         | 26     | 2     | 12     | 2     | 28     |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                           | 28  | 11     | 9      | 4         | 21     | 1     | 8      | 2     | 11     |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                           | 26  | 15     | 13     | 19        | 28     | R     | 10     | 5     | 12     |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                           | 22  | 12     | 35     | 35        | 60     | 6     | 10     | 17    | 17     |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                           | 46  | 24     | 48     | 29        | R      | 1     | 14     | 19    | 25     |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                           | 65  | 10     | 12     | 0         | R      | 2     | 6      | 4     | 5      |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                           | 65  | 16     | 16     | 1         | 43     | 0     | 28     | 1     | 6      |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                           | 66  | 6      | 9      | 0         | 46     | 0     | 7      | 0     | 7      |

**NOTES:**

Values presented for physical and chemical parameters are from field measurements obtained during sampling events.

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = Horizontal Treatment Train average flow rate

Flow V = Vertical Treatment Train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

NM = not measured

NTU = Nephelometric Turbidity Units

OU = operable unit

R = rejected

RDEFF = Rock Drain Effluent

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup>The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup>The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

**Table 11. ORP (millivolts)**

Horizontal and Vertical Wetland Treatment Trains  
 St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study  
*Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01*

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>1,2</sup><br>(gpm) | FDB | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF | AC2EFF |
|-------|------|-----------|------------------------------|--------------------------------|-----|--------|--------|-----------|--------|-------|--------|-------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                           | 64  | 151    | 93     | -428      | -296   | -305  | 49     | -444  | -275   |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                           | -16 | R      | 24     | -259      | -346   | -277  | -38    | -257  | -243   |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                           | -17 | 33     | -49    | -266      | -272   | -245  | 23     | -265  | -230   |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                           | NM  | 46     | -26    | -218      | -237   | -225  | 25     | -244  | -207   |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                           | 32  | 54     | -20    | -192      | -162   | -191  | -58    | -226  | -182   |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                           | 27  | 65     | 45     | -148      | -51    | -90   | 22     | -180  | -146   |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                           | -24 | 41     | 36     | -160      | -40    | -60   | -86    | -203  | -100   |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                           | 27  | 26     | 34     | -108      | 57     | 20    | -21    | -170  | 45     |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                           | -10 | 2      | -29    | -161      | -24    | -21   | -43    | -184  | 3      |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                           | 26  | 65     | 61     | -179      | -96    | -40   | 19     | -207  | -126   |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                           | 21  | 51     | 29     | -129      | -84    | 20    | 36     | -205  | 106    |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                           | -26 | 16     | 19     | -215      | -116   | -33   | -49    | -235  | -138   |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                           | 5   | 45     | 27     | -230      | -152   | 33    | 59     | -256  | -177   |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                           | 1   | 50     | -27    | -225      | -118   | 81    | 3      | -232  | -148   |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W04  | 02-Feb-15 | 27                           | 32                             | -28 | 51     | 6      | -232      | -132   | 43    | -17    | -250  | -158   |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                           | -25 | 37     | -26    | -227      | -138   | 26    | 15     | -221  | -151   |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                           | -4  | 86     | 78     | -231      | -184   | 62    | 96     | -225  | -185   |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                           | 33  | 77     | 81     | -131      | -112   | 51    | 73     | -132  | -108   |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                             | 12  | 45     | 4      | -224      | -154   | 26    | 63     | -235  | -161   |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                           | -15 | 33     | 36     | -179      | -159   | 23    | 87     | -248  | -126   |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                           | -15 | 34     | 20     | -213      | -157   | 42    | 37     | -243  | -151   |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                           | 78  | 135    | 124    | -111      | -121   | 85    | 125    | -141  | -124   |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                           | 163 | 165    | 165    | 69        | -70    | 27    | 170    | -36   | 9      |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                           | 138 | 140    | 115    | 93        | 50     | 153   | 147    | -26   | -57    |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                           | 110 | 127    | 43     | 70        | -90    | 105   | 122    | -158  | -104   |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                           | 74  | 59     | 52     | -21       | -113   | 37    | 59     | -192  | -138   |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                           | 21  | 31     | -2     | -181      | -112   | 15    | 13     | -193  | -139   |

**NOTES:**

Values presented for physical and chemical parameters are from field measurements obtained during sampling events.

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = Horizontal Treatment Train average flow rate

Flow V = Vertical Treatment Train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

mV = millivolts

NM = not measured

ORP = Oxidation Reduction Potential

OU = operable unit

R = rejected

RDEFF = Rock Drain Effluent

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\* = Test Run

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup> The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup> The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 Influent flow rates to better represent metals mass removal by the VWTT.

**Table 12. Dissolved Oxygen (mg/L)**

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>1,2</sup><br>(gpm) | FDB | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF | AC2EFF |
|-------|------|-----------|------------------------------|--------------------------------|-----|--------|--------|-----------|--------|-------|--------|-------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                           | 5.6 | 5.2    | 6.8    | 0.2       | 0.4    | 0.4   | 5.2    | 0.1   | 0.9    |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                           | 6.6 | 2.1    | 6.1    | 0.9       | 0.1    | 1.7   | 3.5    | 1.8   | 3.1    |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                           | 5.9 | 5.7    | 7      | 1.8       | 1.9    | 2.4   | 6.1    | 0.7   | 3.2    |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                           | NM  | 6.1    | 6.7    | 2.6       | 1.8    | 1.2   | 5.9    | 1.4   | 3      |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                           | 6.1 | 6.4    | 7.2    | 3.1       | 3.7    | 1.8   | 5.9    | 1.5   | 2.9    |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                           | 3.9 | 6.3    | 6      | 3.1       | 5.4    | 2.5   | 6.1    | 2.1   | 3.4    |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                           | 6   | 6.2    | 6.1    | 3         | 6.2    | 2.3   | 6      | 2.5   | 4.3    |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                           | ns  | 6.4    | 7.3    | 3.4       | 6      | 3.7   | 6.7    | 3.1   | 5.1    |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                           | 6.1 | 6.2    | 7      | 3.6       | 5.6    | 2.5   | 6      | 1.9   | 2.5    |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                           | 5.5 | 6.2    | 7.3    | 0.3       | 5.2    | 0.2   | 5.6    | 0.5   | 2.8    |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                           | 6   | 6.1    | 7.7    | 1.7       | 5.6    | 1.1   | 5.7    | 0.4   | 3.7    |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                           | 5.7 | 6.2    | 7      | 1.7       | 6.1    | 2.6   | 5.9    | 1.8   | 3.6    |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                           | 5.6 | 5.9    | 6.9    | 0.6       | 5.8    | 0.7   | 5.9    | 0.3   | 2.6    |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                           | 5   | 6.5    | 6.9    | 0.4       | 5.9    | 0.8   | 5.6    | 0.3   | 2.5    |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W04  | 02-Feb-15 | 27.0                         | 32.0                           | 5.3 | 5.9    | 7      | 0.5       | 5.7    | 1.8   | 5.7    | 0.3   | 2.2    |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                           | 5.3 | 5.9    | 7.4    | 0.5       | 6.1    | 2.6   | 6.7    | 0.6   | 2.6    |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                           | 5.5 | 5.7    | 6.8    | 0.7       | 6.2    | 1.3   | 5.6    | 0.4   | 2.9    |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                           | 5.5 | 5.9    | 6.5    | 0.7       | 5.3    | 1.4   | 5.5    | 0.2   | 2.4    |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                             | 5.5 | 5.4    | 6.7    | 0.5       | 5.4    | 0.8   | 5      | 0.1   | 2.9    |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                           | 5.5 | 6.1    | 6.4    | 0.4       | 5      | 0.4   | 5.7    | R     | 3.2    |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                           | 5.5 | 5.6    | 6.4    | 0.4       | 4.5    | 0.9   | 5.4    | 0.3   | 3.9    |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                           | 5.6 | 5.6    | 6.6    | 0.4       | 5.5    | 0.8   | 5.7    | 0.4   | 4.5    |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                           | 5.7 | 5.6    | 6.2    | 1.9       | 6.8    | 1.1   | 5.7    | 0.1   | 5.4    |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                           | 5.9 | 6.1    | 6.2    | 0.7       | 5.9    | 0.3   | 6      | 0.1   | 4.8    |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                           | 5.9 | 6      | 6.6    | 1.1       | 5.8    | 8.1   | 6.2    | 0.2   | 5.2    |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                           | 6.1 | 5.9    | 6.6    | 0.5       | 5.6    | 0.6   | 6.4    | 0.1   | 4.9    |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                           | NM  | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                           | 6.1 | 5.9    | 6.6    | 0.3       | 6      | 0.5   | 6      | 0.3   | 4.4    |

**NOTES:**

Values presented for physical and chemical parameters are from field measurements obtained during sampling events.

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Bioretention Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = Horizontal Treatment Train average flow rate

Flow V = Vertical Treatment Train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

mg/L = milligram per liter

NM = not measured

OU = operable unit

RDEFF = Rock Drain Effluent

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Bioretention Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup> The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup> The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

**Table 13. Temperature (degrees Celsius)**

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

| Phase | Week | Week of   | FLOW H <sup>1</sup><br>(gpm) | FLOW V <sup>1,2</sup><br>(gpm) | FDB  | SB1EFF | SFWEFF | HSSFWMP11 | AC1EFF | RDEFF | SB2EFF | BTEFF | AC2EFF |
|-------|------|-----------|------------------------------|--------------------------------|------|--------|--------|-----------|--------|-------|--------|-------|--------|
| C     | W00  | 15-Sep-14 | 25.8                         | 33.8                           | 18.8 | 18.1   | 18.8   | 14.7      | 16.2   | 12.9  | 18.6   | 18.8  | 16.4   |
| C     | W01  | 22-Sep-14 | 30.7                         | 44.5                           | 20.1 | 19.1   | 19.3   | 17.9      | 19.1   | 17.2  | 19.2   | 18.3  | 18     |
| C     | W02  | 29-Sep-14 | 29.5                         | 41.3                           | 16.8 | 15.5   | 16.4   | 14.4      | 13.2   | 12.1  | 15.3   | 13.5  | 13.2   |
| C     | W03  | 06-Oct-14 | 30.2                         | 35.1                           | NM   | 15.9   | 14     | 13.2      | 13.3   | 12.5  | 15.5   | 15.3  | 15.3   |
| C     | W04  | 13-Oct-14 | 26.8                         | 35.7                           | 18.7 | 17.4   | 18.3   | 15.5      | 15.5   | 18    | 17.5   | 17.5  | 19.4   |
| C     | W05  | 20-Oct-14 | 29.2                         | 35.9                           | 19.6 | 17.7   | 18.2   | 17.1      | 15.3   | 15.2  | 18     | 18.3  | 17.3   |
| C     | W06  | 27-Oct-14 | 27.7                         | 43.2                           | 18.8 | 17.7   | 17.5   | 15.3      | 15.4   | 12.1  | 18.3   | 17.3  | 17.5   |
| C     | W07  | 03-Nov-14 | 28.8                         | 32.0                           | 19.1 | 17.7   | 18.1   | 14.1      | 14.8   | 12.4  | 16.5   | 16.5  | 15.7   |
| C     | W08  | 10-Nov-14 | 27.9                         | 29.8                           | 15.7 | 15.9   | 15.7   | 13.3      | 13.1   | 11.3  | 15.1   | 14.7  | 14.9   |
| C     | W09  | 17-Nov-14 | 27.9                         | 29.2                           | 18.7 | 14.9   | 12.1   | 11.7      | 10.5   | 9.8   | 16.8   | 14.7  | 14.4   |
| C     | W10  | 24-Nov-14 | 27.0                         | 29.2                           | 18.1 | 16.3   | 12.9   | 5.7       | 8.4    | 9.1   | 15.6   | 15.1  | 14.1   |
| C     | W11  | 01-Dec-14 | 25.9                         | 28.5                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W12  | 08-Dec-14 | 25.5                         | 27.8                           | 17.6 | 14.4   | 13     | 12.7      | 9.6    | 10.4  | 15.2   | 14.7  | 15.1   |
| C     | W13  | 15-Dec-14 | 25.1                         | 26.2                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W14  | 22-Dec-14 | 24.1                         | 25.4                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| C     | W15  | 29-Dec-14 | 23.3                         | 24.5                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W00  | 05-Jan-15 | 22.7                         | 25.7                           | 19.2 | 16.1   | 15.5   | 12.1      | 10.9   | 8.9   | 16.7   | 15    | 13.6   |
| TR01  | W01  | 12-Jan-15 | 21.6                         | 27.3                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W02  | 19-Jan-15 | 20.4                         | 25.9                           | 18.9 | 14.5   | 13.2   | 10.6      | 9.2    | 7.9   | 15.1   | 14.9  | 14.4   |
| TR01  | W03  | 26-Jan-15 | 21.9                         | 30.8                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W04  | 02-Feb-15 | 27.0                         | 32.0                           | 19.2 | 16.4   | 16.2   | 12.5      | 11.4   | 9.1   | 16.3   | 15.9  | 15.4   |
| TR01  | W05  | 09-Feb-15 | 27.8                         | 30.3                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W06  | 16-Feb-15 | 28.7                         | 29.4                           | 19.2 | 15.9   | 16     | 11.1      | 10     | 8.3   | 14.7   | 14.4  | 13.8   |
| TR01  | W07  | 23-Feb-15 | 28.7                         | 25.2                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W08  | 02-Mar-15 | 28.2                         | 24.9                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W09  | 09-Mar-15 | 29.3                         | 28.1                           | 19.3 | 16.9   | 16.7   | 13.3      | 12.2   | 10.5  | 15.6   | 14.9  | 14     |
| TR01  | W10  | 16-Mar-15 | 29.5                         | 29.7                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR01  | W11  | 23-Mar-15 | 34.9                         | 36.4                           | 18.6 | 16.8   | 16.1   | 14.1      | 13.2   | 12.1  | 16.2   | 15.8  | 15.1   |
| TR01  | W12  | 30-Mar-15 | 34.4                         | 38.5                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W00  | 06-Apr-15 | 32.3                         | 36                             | 18.7 | 17.3   | 17.7   | 14.3      | 14.3   | 12.2  | 16     | 16.1  | 15.5   |
| TR02  | W01  | 13-Apr-15 | 38                           | 39.8                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W02  | 20-Apr-15 | 36.7                         | 39.3                           | 19.3 | 19.4   | 20.6   | 15.5      | 15.7   | 13.1  | 17.4   | 17.1  | 16.2   |
| TR02  | W03  | 27-Apr-15 | 36.1                         | 39.3                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W04  | 04-May-15 | 35.2                         | 39.1                           | 19.2 | 18.4   | 17.7   | 16        | 16.1   | 13.3  | 17.9   | 16.6  | 16.6   |
| TR02  | W05  | 11-May-15 | 33.4                         | 37.8                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W06  | 18-May-15 | 32.0                         | 36.6                           | 19   | 19.1   | 20     | 16        | 15.8   | 13.7  | 17.1   | 16.9  | 16.5   |
| TR02  | W07  | 25-May-16 | 31.9                         | 36.2                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W08  | 01-Jun-15 | 31.3                         | 35.7                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W09  | 08-Jun-15 | 30.9                         | 35.3                           | 18.8 | 18.7   | 19.2   | 16.3      | 16.5   | 15.7  | 18.4   | 17.5  | 17.3   |
| TR02  | W10  | 15-Jun-15 | 30.8                         | 35.6                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W11  | 22-Jun-15 | 30.9                         | 35.7                           | 19.5 | 20     | 21.6   | 18.6      | 18.7   | 17.3  | 18     | 18.1  | 18     |
| TR02  | W12  | 29-Jun-15 | 30.3                         | 35.5                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W13  | 06-Jul-15 | 30.0                         | 35.4                           | 18.7 | 18.5   | 17.6   | 16.8      | 17     | 15.8  | 17.5   | 17.3  | 17.5   |
| TR02  | W14  | 13-Jul-15 | 30.4                         | 35.7                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W15  | 20-Jul-15 | 30.5                         | 35.7                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W16  | 27-Jul-15 | 28.6                         | 33.7                           | 19   | 19.5   | 21.9   | 17        | 18.1   | 16.5  | 17.8   | 17.6  | 17.6   |
| TR02  | W17  | 03-Aug-15 | 28.2                         | 33.3                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W18  | 10-Aug-15 | 28.4                         | 33.6                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W19  | 17-Aug-15 | 28.3                         | 33.8                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W20  | 24-Aug-15 | 28.3                         | 33.8                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W21  | 31-Aug-15 | 25.7                         | 31.9                           | NM   | NM     | NM     | NM        | NM     | NM    | NM     | NM    | NM     |
| TR02  | W22  | 07-Sep-15 | 25.0                         | 32.6                           | 18.9 | 19.4   | 21.1   | 15.9      | 17.1   | 15.2  | 17.1   | 16.8  | 16.7   |

**NOTES:**

Values presented for physical and chemical parameters are from field measurements obtained during sampling events.

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

BTEFF = Bioretention Cell Effluent/Aeration Cascade Influent

C = Colonization

DEG C = degrees celsius

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

Flow H = Horizontal Treatment Train average flow rate

Flow V = Vertical Treatment Train average flow rate

gpm = gallons per minute

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

NM = not measured

OU = operable unit

RDEFF = Rock Drain Effluent

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Bioretention Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

<sup>1</sup>The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.<sup>2</sup>The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

**Table 14. Mass Removal**

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

## *Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01*

Table 14. Mass Removal

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

| Phase | Week | Week of   | Analyte Name       | FDB<br>(µg/L) | RDEFF<br>(µg/L) | H Δ CONC<br>(µg/L) | H FLOW<br>(gpm) | H FLOW TOTAL<br>(gallons) | H REMOVAL EFFICIENCY<br>(%) | H MASS REMOVAL RATE<br>(g/day) | AC2EFF<br>(µg/L) | V Δ CONC<br>(µg/L) | V FLOW<br>(gpm) | V FLOW TOTAL<br>(gallons) | V REMOVAL EFFICIENCY<br>(%) | V MASS REMOVAL RATE<br>(g/day) |
|-------|------|-----------|--------------------|---------------|-----------------|--------------------|-----------------|---------------------------|-----------------------------|--------------------------------|------------------|--------------------|-----------------|---------------------------|-----------------------------|--------------------------------|
| TR02  | W22  | 07-Sep-15 | Cadmium, Dissolved | 22.1          | <0.5            | 22.1               | 25.0            | 251800                    | 100                         | 3                              | <0.5             | 22.1               | 32.6            | 328300                    | 100                         | 3.9                            |
| C     | W00  | 15-Sep-14 | Iron               | 4500          | 250             | 4250               | 25.8            | 259600                    | 94.4                        | 597.7                          | 246              | 4254               | 33.8            | 340200                    | 94.5                        | 783.8                          |
| C     | W01  | 22-Sep-14 | Iron               | 3740          | 170             | 3570               | 30.7            | 309600                    | 95.5                        | 597.4                          | 218              | 3522               | 44.5            | 448200                    | 94.2                        | 854.3                          |
| C     | W02  | 29-Sep-14 | Iron               | 4230          | 129             | 4101               | 29.5            | 297200                    | 97                          | 659.5                          | 210              | 4020               | 41.3            | 416100                    | 95                          | 905                            |
| C     | W03  | 06-Oct-14 | Iron               | 3940          | 134             | 3806               | 30.2            | 304,500                   | 96.6                        | 626.5                          | 165              | 3775               | 35.1            | 353800                    | 95.8                        | 722.3                          |
| C     | W04  | 13-Oct-14 | Iron               | 3820          | 144             | 3676               | 26.8            | 270,000                   | 96.2                        | 537                            | 154              | 3666               | 35.7            | 359700                    | 96                          | 713.4                          |
| C     | W05  | 20-Oct-14 | Iron               | 5730          | 326             | 5404               | 29.2            | 294,600                   | 94.4                        | 860.1                          | 143              | 5587               | 35.9            | 361600                    | 97.5                        | 1093.3                         |
| C     | W06  | 27-Oct-14 | Iron               | 24100         | 1340            | 22760              | 27.7            | 278,800                   | 94.4                        | 3436.6                         | 137              | 23963              | 43.2            | 435500                    | 99.4                        | 5642.9                         |
| C     | W07  | 03-Nov-14 | Iron               | 4550          | 297             | 4253               | 28.8            | 290,300                   | 93.5                        | 667.7                          | 153              | 4397               | 32              | 322600                    | 96.6                        | 767                            |
| C     | W08  | 10-Nov-14 | Iron               | 5720          | 99.6            | 5620.4             | 27.9            | 280,900                   | 98.3                        | 854.8                          | 148              | 5572               | 29.8            | 300300                    | 97.4                        | 905.1                          |
| C     | W09  | 17-Nov-14 | Iron               | 8800          | 141             | 8659               | 27.9            | 281,100                   | 98.4                        | 1316.9                         | 260              | 8540               | 29.2            | 294300                    | 97                          | 1359.3                         |
| C     | W10  | 24-Nov-14 | Iron               | 5230          | <50             | 5230               | 27.0            | 271,700                   | 100                         | 769.7                          | 245              | 4985               | 29.2            | 294300                    | 95.3                        | 793.5                          |
| C     | W11  | 01-Dec-14 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| C     | W12  | 08-Dec-14 | Iron               | 5710          | <50             | 5710               | 25.5            | 257,200                   | 100                         | 793.7                          | 156              | 5554               | 27.8            | 279900                    | 97.3                        | 841.6                          |
| C     | W13  | 15-Dec-14 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| C     | W14  | 22-Dec-14 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| C     | W15  | 29-Dec-14 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W00  | 05-Jan-15 | Iron               | 6130          | <50             | 6130               | 22.7            | 228,700                   | 100                         | 758.5                          | 131              | 5999               | 25.7            | 259200                    | 97.9                        | 840.4                          |
| TR01  | W01  | 12-Jan-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W02  | 19-Jan-15 | Iron               | 7510          | <50             | 7510               | 20.4            | 206,100                   | 100                         | 835.1                          | 109              | 7401               | 25.9            | 261400                    | 98.5                        | 1044.9                         |
| TR01  | W03  | 26-Jan-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W04  | 02-Feb-15 | Iron               | 7980          | <50             | 7980               | 27.0            | 272,600                   | 100                         | 1174.5                         | 162              | 7818               | 32              | 322200                    | 98                          | 1363.7                         |
| TR01  | W05  | 09-Feb-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W06  | 16-Feb-15 | Iron               | 9530          | <50             | 9530               | 28.6            | 288,400                   | 100                         | 1485.7                         | 142              | 9388               | 29.3            | 295600                    | 98.5                        | 1499.4                         |
| TR01  | W07  | 23-Feb-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W08  | 02-Mar-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W09  | 09-Mar-15 | Iron               | 10400         | <50             | 10400              | 29.3            | 295,000                   | 100                         | 1661                           | 138              | 10262              | 28.1            | 283300                    | 98.7                        | 1571.9                         |
| TR01  | W10  | 16-Mar-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W11  | 23-Mar-15 | Iron               | 8450          | <50             | 8450               | 34.9            | 352,200                   | 100                         | 1607.5                         | 291              | 8159               | 36.4            | 367300                    | 96.6                        | 1618.9                         |
| TR01  | W12  | 30-Mar-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W00  | 06-Apr-15 | Iron               | 9260          | <50             | 9260               | 32.3            | 325,100                   | 100                         | 1630.4                         | 202              | 9058               | 36              | 362700                    | 97.8                        | 1777.5                         |
| TR02  | W01  | 13-Apr-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W02  | 20-Apr-15 | Iron               | 9020          | <50             | 9020               | 36.7            | 369,600                   | 100                         | 1804.5                         | 261              | 8759               | 39.3            | 395800                    | 97.1                        | 1876.4                         |
| TR02  | W03  | 27-Apr-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W04  | 04-May-15 | Iron               | 8630          | 75.8            | 8554.2             | 35.2            | 355,100                   | 99.1                        | 1642.6                         | 210              | 8420               | 39.1            | 393700                    | 97.6                        | 1794.6                         |
| TR02  | W05  | 11-May-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W06  | 18-May-15 | Iron               | 5460          | <50             | 5460               | 32.0            | 322800                    | 100                         | 953.1                          | 425              | 5035               | 36.6            | 368600                    | 92.2                        | 1004.5                         |
| TR02  | W07  | 25-May-16 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W08  | 01-Jun-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W09  | 08-Jun-15 | Iron               | 4150          | 68.8            | 4081.2             | 31.2            | 314000                    | 98.3                        | 694.1                          | 905              | 3245               | 35.6            | 358800                    | 78.2                        | 629.6                          |
| TR02  | W10  | 15-Jun-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W11  | 22-Jun-15 | Iron               | 2990          | 106             | 2884               | 30.9            | 311300                    | 96.5                        | 485.8                          | 570              | 2420               | 35.7            | 360300                    | 80.9                        | 470.9                          |
| TR02  | W12  | 29-Jun-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W13  | 06-Jul-15 | Iron               | 3860          | 53.9            | 3806.1             | 30.0            | 302800                    | 98.6                        | 623.2                          | 323              | 3537               | 35.4            | 357000                    | 91.6                        | 682.8                          |
| TR02  | W14  | 13-Jul-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W15  | 20-Jul-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W16  | 27-Jul-15 | Iron               | 4480          | <50             | 4480               | 28.6            | 289900                    | 100                         | 698.4                          | 224              | 4256               | 33.7            | 339400                    | 95                          | 781.8                          |
| TR02  | W17  | 03-Aug-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W18  | 10-Aug-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W19  | 17-Aug-15 | Iron               | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W20  | 24-Aug-15 | Iron               | NS            | NS              |                    |                 |                           |                             |                                |                  |                    |                 |                           |                             |                                |

**Table 14. Mass Removal**

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

## *Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01*

Table 14. Mass Removal

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

| Phase | Week | Week of   | Analyte Name         | FDB<br>(µg/L) | RDEFF<br>(µg/L) | H Δ CONC<br>(µg/L) | H FLOW<br>(gpm) | H FLOW TOTAL<br>(gallons) | H REMOVAL EFFICIENCY<br>(%) | H MASS REMOVAL RATE<br>(g/day) | AC2EFF<br>(µg/L) | V Δ CONC<br>(µg/L) | V FLOW<br>(gpm) | V FLOW TOTAL<br>(gallons) | V REMOVAL EFFICIENCY<br>(%) | V MASS REMOVAL RATE<br>(g/day) |
|-------|------|-----------|----------------------|---------------|-----------------|--------------------|-----------------|---------------------------|-----------------------------|--------------------------------|------------------|--------------------|-----------------|---------------------------|-----------------------------|--------------------------------|
| TR02  | W20  | 24-Aug-15 | Iron, Dissolved      | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W21  | 31-Aug-15 | Iron, Dissolved      | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W22  | 07-Sep-15 | Iron, Dissolved      | 184           | <50             | 184                | 25.0            | 251800                    | 100                         | 25.1                           | 141              | 43                 | 32.6            | 328300                    | 23.4                        | 7.6                            |
| C     | W00  | 15-Sep-14 | Manganese, Dissolved | 2080          | 1760            | 320                | 25.8            | 259,600                   | 15.4                        | 45                             | 1700             | 380                | 33.8            | 340200                    | 18.3                        | 70                             |
| C     | W01  | 22-Sep-14 | Manganese, Dissolved | 2160 J        | 1620            | 540                | 30.7            | 309,600                   | 25                          | 90.4                           | 1970             | 190                | 44.5            | 448200                    | 8.8                         | 46.1                           |
| C     | W02  | 29-Sep-14 | Manganese, Dissolved | 2200          | 1500            | 700                | 29.5            | 297,200                   | 31.8                        | 112.6                          | 2110             | 90                 | 41.3            | 416100                    | 4.1                         | 20.3                           |
| C     | W03  | 06-Oct-14 | Manganese, Dissolved | 2260          | 1750 J          | 510                | 30.2            | 304,500                   | 22.6                        | 84                             | 2160             | 100                | 35.1            | 353800                    | 4.4                         | 19.1                           |
| C     | W04  | 13-Oct-14 | Manganese, Dissolved | 2310 B        | 1970 B          | 340                | 26.8            | 270,000                   | 14.7                        | 49.7                           | 2040 B           | 270                | 35.7            | 359700                    | 11.7                        | 52.5                           |
| C     | W05  | 20-Oct-14 | Manganese, Dissolved | 2270          | 2030            | 240                | 29.2            | 294,600                   | 10.6                        | 38.2                           | 1820             | 450                | 35.9            | 361600                    | 19.8                        | 88.1                           |
| C     | W06  | 27-Oct-14 | Manganese, Dissolved | 2220          | 1650 J          | 570                | 27.7            | 278,800                   | 25.7                        | 86.1                           | 1520             | 700                | 43.2            | 435500                    | 31.5                        | 164.8                          |
| C     | W07  | 03-Nov-14 | Manganese, Dissolved | 2250          | 594             | 1656               | 28.8            | 290,300                   | 73.6                        | 260                            | 1750 J           | 500                | 32              | 322600                    | 22.2                        | 87.2                           |
| C     | W08  | 10-Nov-14 | Manganese, Dissolved | 2400          | 293             | 2107               | 27.9            | 280,900                   | 87.8                        | 320.4                          | 1750             | 650                | 29.8            | 300300                    | 27.1                        | 105.6                          |
| C     | W09  | 17-Nov-14 | Manganese, Dissolved | 2260          | 396             | 1864               | 27.9            | 281,100                   | 82.5                        | 283.5                          | 1680             | 580                | 29.2            | 294300                    | 25.7                        | 92.3                           |
| C     | W10  | 24-Nov-14 | Manganese, Dissolved | 2180          | 106             | 2074               | 27.0            | 271,700                   | 95.1                        | 305.2                          | 1340             | 840                | 29.2            | 294300                    | 38.5                        | 133.7                          |
| C     | W11  | 01-Dec-14 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| C     | W12  | 08-Dec-14 | Manganese, Dissolved | 2200          | 232             | 1968               | 25.5            | 257,200                   | 89.5                        | 273.6                          | 571              | 1629               | 27.8            | 279900                    | 74                          | 246.9                          |
| C     | W13  | 15-Dec-14 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| C     | W14  | 22-Dec-14 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| C     | W15  | 29-Dec-14 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W00  | 05-Jan-15 | Manganese, Dissolved | 2150          | 141             | 2009               | 22.7            | 228,700                   | 93.4                        | 248.6                          | 520              | 1630               | 25.7            | 259200                    | 75.8                        | 228.3                          |
| TR01  | W01  | 12-Jan-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W02  | 19-Jan-15 | Manganese, Dissolved | 2070          | 190             | 1880               | 20.4            | 206,100                   | 90.8                        | 209.1                          | 618              | 1452               | 25.9            | 261400                    | 70.1                        | 205                            |
| TR01  | W03  | 26-Jan-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W04  | 02-Feb-15 | Manganese, Dissolved | 2070          | 654             | 1416               | 27.0            | 272,600                   | 68.4                        | 208.4                          | 1270             | 800                | 32              | 322200                    | 38.6                        | 139.5                          |
| TR01  | W05  | 09-Feb-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W06  | 16-Feb-15 | Manganese, Dissolved | 2100          | 721             | 1379               | 28.6            | 288,400                   | 65.7                        | 215                            | 521              | 1579               | 29.3            | 295600                    | 75.2                        | 252.2                          |
| TR01  | W07  | 23-Feb-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W08  | 02-Mar-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W09  | 09-Mar-15 | Manganese, Dissolved | 2090          | 641             | 1449               | 29.3            | 295,000                   | 69.3                        | 231.4                          | 500              | 1590               | 28.1            | 283300                    | 76.1                        | 243.5                          |
| TR01  | W10  | 16-Mar-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR01  | W11  | 23-Mar-15 | Manganese, Dissolved | 2070          | 1020            | 1050               | 34.9            | 352,200                   | 50.7                        | 199.8                          | 558              | 1512               | 36.4            | 367300                    | 73                          | 300                            |
| TR01  | W12  | 30-Mar-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W00  | 06-Apr-15 | Manganese, Dissolved | 1870 B        | 913 B           | 957                | 32.3            | 325,100                   | 51.2                        | 168.5                          | 1040 B           | 830                | 36              | 362700                    | 44.4                        | 162.9                          |
| TR02  | W01  | 13-Apr-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W02  | 20-Apr-15 | Manganese, Dissolved | 1840          | 732 J           | 1108               | 36.7            | 369,600                   | 60.2                        | 221.7                          | 844 J            | 996                | 39.3            | 395800                    | 54.1                        | 213.4                          |
| TR02  | W03  | 27-Apr-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W04  | 04-May-15 | Manganese, Dissolved | 1910          | 949             | 961                | 35.2            | 355,100                   | 50.3                        | 184.5                          | 689              | 1221               | 39.1            | 393700                    | 63.9                        | 260.2                          |
| TR02  | W05  | 11-May-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W06  | 18-May-15 | Manganese, Dissolved | 4260          | 387             | 3873               | 32.0            | 322800                    | 90.9                        | 676.1                          | 1080             | 3180               | 36.6            | 368600                    | 74.6                        | 634.4                          |
| TR02  | W07  | 25-May-16 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W08  | 01-Jun-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W09  | 08-Jun-15 | Manganese, Dissolved | 3970          | 69.8            | 3900.2             | 31.2            | 314000                    | 98.2                        | 663.3                          | 3730             | 240                | 35.6            | 358800                    | 6                           | 46.6                           |
| TR02  | W10  | 15-Jun-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W11  | 22-Jun-15 | Manganese, Dissolved | 3440 B        | 37.9 B          | 3402.1             | 30.9            | 311300                    | 98.9                        | 573                            | 4210 B           | -770               | 35.7            | 360300                    | -22.4                       | -149.8                         |
| TR02  | W12  | 29-Jun-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W13  | 06-Jul-15 | Manganese, Dissolved | 3350          | 328             | 3022               | 30.0            | 302800                    | 90.2                        | 494.8                          | 3810             | -460               | 35.4            | 357000                    | -13.7                       | -88.8                          |
| TR02  | W14  | 13-Jul-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W15  | 20-Jul-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        | NS                          | NS                             | NS               | NS                 | NS              | NS                        | NS                          | NS                             |
| TR02  | W16  | 27-Jul-15 | Manganese, Dissolved | 2860          | 736             | 2124               | 28.6            | 289900                    | 74.3                        | 331.1                          | 1540             | 1320               | 33.7            | 339400                    | 46.2                        | 242.5                          |
| TR02  | W17  | 03-Aug-15 | Manganese, Dissolved | NS            | NS              | NS                 | NS              | NS                        |                             |                                |                  |                    |                 |                           |                             |                                |

**Table 14. Mass Removal**

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

## *Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01*

**Table 14. Mass Removal**

Horizontal and Vertical Wetland Treatment Trains

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

| <b>Phase</b> | <b>Week</b> | <b>Week of</b> | <b>Analyte Name</b> | <b>FDB<br/>(µg/L)</b> | <b>RDEFF<br/>(µg/L)</b> | <b>H Δ CONC<br/>(µg/L)</b> | <b>H FLOW<br/>(gpm)</b> | <b>H FLOW TOTAL<br/>(gallons)</b> | <b>H REMOVAL EFFICIENCY<br/>(%)</b> | <b>H MASS REMOVAL RATE<br/>(g/day)</b> | <b>AC2EFF<br/>(µg/L)</b> | <b>V Δ CONC<br/>(µg/L)</b> | <b>V FLOW<br/>(gpm)</b> | <b>V FLOW TOTAL<br/>(gallons)</b> | <b>V REMOVAL EFFICIENCY<br/>(%)</b> | <b>V MASS REMOVAL RATE<br/>(g/day)</b> |
|--------------|-------------|----------------|---------------------|-----------------------|-------------------------|----------------------------|-------------------------|-----------------------------------|-------------------------------------|--|--------------------------|----------------------------|-------------------------|-----------------------------------|-------------------------------------|--|
| TR02         | W18         | 10-Aug-15      | Zinc, Dissolved     | NS                    | NS                      | NS                         | NS                      | NS                                | NS                                  | NS                                     | NS                       | NS                         | NS                      | NS                                | NS                                  | NS                                     |
| TR02         | W19         | 17-Aug-15      | Zinc, Dissolved     | NS                    | NS                      | NS                         | NS                      | NS                                | NS                                  | NS                                     | NS                       | NS                         | NS                      | NS                                | NS                                  | NS                                     |
| TR02         | W20         | 24-Aug-15      | Zinc, Dissolved     | NS                    | NS                      | NS                         | NS                      | NS                                | NS                                  | NS                                     | NS                       | NS                         | NS                      | NS                                | NS                                  | NS                                     |
| TR02         | W21         | 31-Aug-15      | Zinc, Dissolved     | NS                    | NS                      | NS                         | NS                      | NS                                | NS                                  | NS                                     | NS                       | NS                         | NS                      | NS                                | NS                                  | NS                                     |
| TR02         | W22         | 07-Sep-15      | Zinc, Dissolved     | 4030                  | 83.1                    | 3946.9                     | 25.0                    | 251800                            | 97.9                                | 537.4                                  | 20                       | 4010                       | 32.6                    | 328300                            | 99.5                                | 711.9                                  |

**NOTES:**

Non-detects are reported as &lt;RL and estimated as zero for calculations and graphing.

% = percent

AC1EFF = Aeration Channel Effluent/Rock Drain Influent

AC2EFF = Aeration Cascade Effluent

B = Analyte is detected in an associated blank

BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent

C = Colonization

FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)

g/day = grams per day

gpm = gallons per minute

H = horizontal

H Δ CONC = horizontal change in concentration

HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent

J = Estimated result

MDL = method detection limit

NS = not sampled

OU = operable unit

ppm = parts per million

RDEFF = Rock Drain Effluent

RL = reporting limit

SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent

SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent

SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent

TR\*\* = Test Run

V = vertical

V Δ CONC = vertical change in concentration

VWTT = Vertical Wetland Treatment Train

W\*\* = Week of Treatability Study Phase

The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

Wetland Plant Update

SEPTEMBER 2015

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

## RICO WETLAND DEMONSTRATION PROJECT - SF and HSSF WETLAND CELLS

September 22, 2015 Monitoring



Photograph 1: SF Wetland with Planted Bulrush and Sedge – Looking South on September 22, 2015



Photograph 2: SF Wetland with Planted Bulrush and Sedge – Looking West on September 22, 2015

## RICO WETLAND DEMONSTRATION PROJECT - SF and HSSF WETLAND CELLS

September 22, 2015 Monitoring



Photograph 3: SF Wetland with Planted Sedge - Looking Southeast on September 22, 2015



Photograph 4: SF Wetland with Planted Bulrush and Sedge - Looking Northeast on September 22, 2015

## RICO WETLAND DEMONSTRATION PROJECT - SF and HSSF WETLAND CELLS

September 22, 2015 Monitoring



Photograph 5: SF Wetland Close-up of Planted Bulrush and Sedge on September 22, 2015



Photograph 6: HSSF Wetland with Establishing Wetland Plants – Looking South on September 22, 2015

## RICO WETLAND DEMONSTRATION PROJECT - SF and HSSF WETLAND CELLS

September 22, 2015 Monitoring



Photograph 7: HSSF Wetland –Sampling Points Comparing Planted Vegetation on either side of Southwestern FRP on September 22, 2015



Photograph 8: HSSF Wetland –Sampling Points Comparing Planted Vegetation on either side of Southwestern FRP on September 22, 2015

## RICO WETLAND DEMONSTRATION PROJECT - SF and HSSF WETLAND CELLS

September 22, 2015 Monitoring



Photograph 9: HSSF Wetland - Sampling Point Comparing Planted Vegetation on either side of Southwestern FRP on September 22, 2015



Photograph 10: HSSF Wetland – Sampling Point in Matrix –  
Located East of Middle FRP on September 22, 2015

## RICO WETLAND DEMONSTRATION PROJECT - SF and HSSF WETLAND CELLS

September 22, 2015 Monitoring



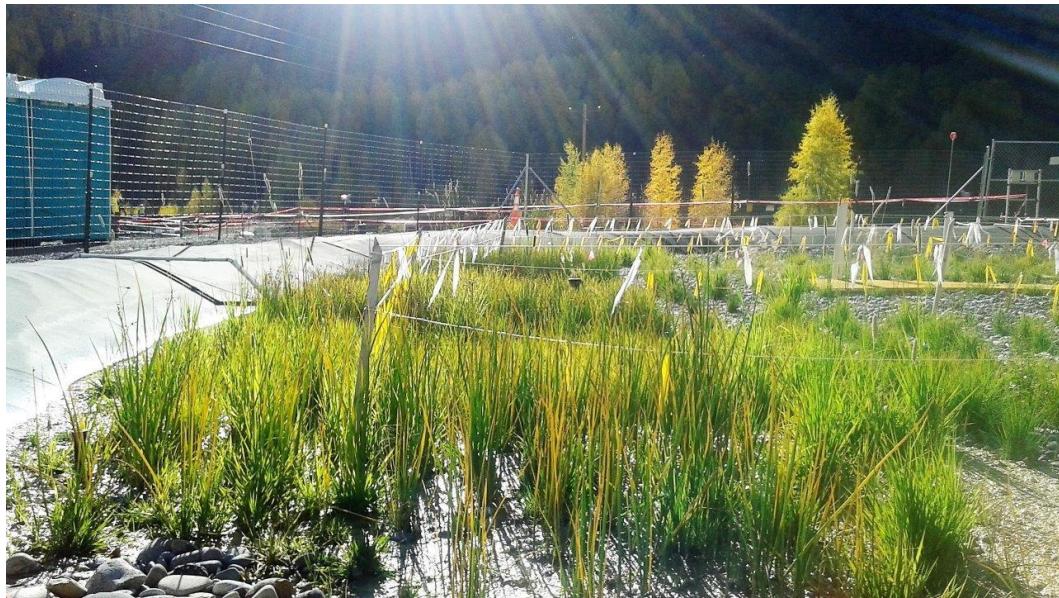
Photograph 11: HSSF Wetland – Sampling Point in Northern Soil Test Strip  
Reviewing Planted Wetland Vegetation Success on September 22, 2015



Photograph 12: HSSF Wetland – Sampling Point Located in Southeast Quadrant  
East of Southeast FRP on September 22, 2015

## RICO WETLAND DEMONSTRATION PROJECT - SF and HSSF WETLAND CELLS

September 22, 2015 Monitoring



Photograph 13: HSSF Wetland – Close-up Photo of Southern Soil Test Strip showing Established Wetland Plants on September 22, 2015



Photograph 14: HSSF Wetland – Close-up Photo of Baltic rush planted wetland species showing Large Root Mass on September 22, 2015

# RICO WETLAND DEMONSTRATION PROJECT - SF and HSSF WETLAND CELLS

September 22, 2015 Monitoring

HSSE Wetland Plant - Monitoring Plot Locations

